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Part II

# Department of the Interior

## Bureau of Land Management

## Proposed Guidance for National Environmental Policy Act (NEPA) Implementing Procedures

## DEPARTMENT OF THE INTERIOR

### Bureau of Land Management

### Guidance for Compliance With the National Environmental Policy Act (NEPA)

**AGENCY:** Bureau of Land Management, Interior.

**ACTION:** Proposed guidance for NEPA Implementing Procedures.

**SUMMARY:** On November 29, 1978, the Council on Environmental Quality (CEQ) published, at 43 FR 55978–56007 (40 CFR Parts 1500–1508), its final regulations for implementing the procedural provisions of NEPA. The Department of the Interior, on July 10, 1979, published, at 44 FR 40436–40443, draft Departmental Manual guidance for compliance with the CEQ's NEPA Regulations. The final form of this Departmental Manual is undergoing Secretarial-level review and approval and its publication in the **Federal Register** is imminent. This notice is to advise the public of draft Bureau of Land Management guidance which, in combination with guidance in the Departmental Manual, will be used for NEPA implementation when tested, revised, and published in final form.

**DATES:** This proposed guidance for compliance with NEPA is effective (for new environmental analyses) as of March 19, 1980 and will remain in effect until a final form is published which reflects the results of field-testing and public comment. Comments on the proposed guidance will be accepted until May 1, 1980.

**ADDRESS:** Comments should be sent to: Director (202), Bureau of Land Management, 1800 C Street NW., Washington, D.C. 20240.

**FOR FURTHER INFORMATION CONTACT:** Bruce L. Bandurski, (202) 343–7417.

**SUPPLEMENTAL INFORMATION:** On November 19, 1979, the Assistant Secretary, Land and Water Resources, of the Department of the Interior, delegated to the Director of the Bureau of Land Management certain responsibilities and authority for implementation of the National Environmental Policy Act of 1969, as amended. The following guidance, developed pursuant to Secretarial decision of June 11, 1979, proposes a system by which the Bureau of Land Management (BLM) would carry out these delegated responsibilities.

This system for NEPA implementation had its beginnings in 1977. That year two BLM initiatives were taken to more effectively implement NEPA and related environmental law. The first of these initiatives was dubbed "EcolInt"; it involved an interdisciplinary group, constituted to advance the Bureau's ability in identifying and describing ecological interrelationships pursuant to NEPA sections 102(2)(A) and 102(2)(H). The second initiative was a Bureauwide fact-finding effort. It was initiated September 29, 1977, to find ways of increasing the effectiveness, efficiency, and quality of the NEPA process in BLM.

The system which grew from these endeavors reflects a decade of firsthand experience in applying NEPA to management of public lands and the outer continental shelf. It also reflects concerns of an interested public which desires agency consideration of a spectrum of environmental values. And, of course, it comprises guidance that is a consistent subset of CEQ's NEPA Regulations. The principal aims of this system are: (1) to produce better decisions which further the national policy to enhance the quality of the human environment; (2) to enrich the understanding of the ecological systems and natural resources important to the Nation; (3) to prevent, eliminate, or minimize damage to the environment and ecosphere; (4) to reduce paperwork and to reduce delays in addressing issues which are ripe for decision.

The proposed environmental protection and enhancement system will be presented in a series of ten "guidebooks" written to facilitate BLM's use of the NEPA process.[1] The guidebooks' purpose is to give specific guidance to Bureau personnel who must apply the NEPA process in day-to-day operations.

The first two guidebooks in the series are published as proposed guidance to be field-tested and to elicit public comment during this testing period. They are printed, in full, following this supplementary information. If these two guidebooks prove useful and feasible, development of the remaining guidebooks in the proposed series will begin in earnest.

The "preamble" to the BLM 1790–1799 guidebook series comprises two articles; these were presented in draft to a Bureauwide environmental analysis workshop in 1978. This preamble provides a full context for any reader's understanding of the guidebooks which follow. Familiarity with the essence of this preamble and with the overview of BLM's environmental protection and enhancement system (Guidebook 1790) will enable readers to better understand each of the guidebooks in this series.

The preamble's articles are to be included as introductory material in a set of looseleaf binders containing the prospective guidebooks. Single copies of these preamble articles, in their entirety, are available upon request.

Dated: March 10, 1980.

**Ed Hastey,**

*Associate Director.*

[1] The last of these, Guidebook 1799, is not yet specified as to topic. If the glossary of terms being developed for Guidebook 1790 becomes voluminous, an entire Guidebook (1799) may be devoted to terminology for the guidebook series.

### Guidebook Section 1790

**Environmental Protection and Enchancement System**

.01 Purpose of Guidebook Section 1790
.02 Objectives
.03 Authority
.04 Responsibility
.05 Definitions (see Glossary of Terms)
.06 Policy
.07 Principles
.08 Program Decision Points
.09 System Overview and Coordination
.1 Environmental Analysis and Decisionmaking Process
.2 Environmental Documents
.3 Lead Agency (or Sub-Unit) Determination and Pre-Decision Referrals
.4 Decision Criteria, Records, and Implementation
.5 Monitoring
.6 Ecosystem Modeling
.7 Review of Non-BLM Environmental Documents
.8 Environmental Knowledge and Awareness
.9 [Reserved]

.01 *Purpose of Guidebook Section 1790.* This section introduces the BLM's Environmental Protection and Enhancement System. The system provides means by which Council on Environmental Quality (CEQ) regulations for the National Environmental Policy Act of 1969 (NEPA) are incorporated into BLM's planning and decisionmaking. Specifically, the Environmental Protection and Enhancement System is designed to comply with the requirements of Section 2 and Title I of NEPA. The system applies to all programs, branches, and offices of the BLM.

.02 *Objectives.* "The National Environmental Policy Act (NEPA) is our basic national charter for protection of the environment. It establishes policy, sets goals (Section 101), and provides means (Section 102) for carrying out the policy. Section 102(2) contains action-forcing provisions to make sure that Federal agencies act according to the letter and spirit of the Act * * *

"* * * it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork—even excellent paperwork—but to foster

excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment" (40 CFR 1500.1).

The central objective is to establish an Environmental Protection and Enhancement System through which the Bureau will strive to:

1. Prevent, eliminate, or minimize damage to the environment and ecosphere by:

a. Encouraging productive and enjoyable harmony between man and his environment,

b. Identifying and analyzing emergent properties of whole systems that relate to the health and welfare of man, and

c. Providing land managers with information about stress points in the ecosystem in order for them to better balance the consideration of short-term uses of the environment and long-term productivity;

2. Enrich the understanding of ecological systems and natural resources important to the Nation by:

a. Detecting gaps and defects in our environmental awareness and understanding of system interrelationships, and

b. Correcting those gaps and defects by systematic interdisciplinary analysis and synthesis;

3. Reduce paperwork in documenting environmental analysis and reduce delay in reaching decisions; and

4. Produce better decisions in seeking and attaining clearly stated environmental goals.

.03 *Authority.* The BLM is authorized and directed by NEPA to carry out its programs in ways that will create and maintain conditions under which man and nature can exist in productive harmony and fulfill social and economic needs of present and future generations of Americans.

Several basic authorities require a systematic, interdisciplinary approach to planning and decisionmaking. These include:

A. The National Environmental Policy Act of 1969, as amended (and related treaties, conventions, agreements, legislation, and regulations).

B. The Environmental Quality Improvement Act of 1970, as amended.

C. Section 309 of the Clean Air Act, as amended.

D. Executive Order 11514, as amended by Executive Order 11991, Protection and Enhancement of the Environment through Regulations Designed to Make the Environmental Impact Statement Process more Useful to Decisionmakers and the Public.

E. The Federal Land Policy and Management Act of 1976.

F. The Outer Continental Shelf Lands Act as amended.

G. The Coastal Zone Management Act.

H. Department of the Interior Departmental Manual, Part 135 (135 DM 3.1) and Part 516.

I. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions.

.04 *Responsibility.* The BLM, as a Federal agency sub-unit, has an active and affirmative responsibility to protect the public interest as expressed in the Bureau's statutory mandates and those mandates of the Department that have been delegated. These responsibilities cover environmental resources and values associated with management of uplands, the coastal zone, and the outer continental shelf.

A. The Director of BLM is responsible for overall direction of the Environmental Protection and Enhancement System. Appendix 5 of Part 516 DM 6, Department of the Interior Departmental Manual, specifies those environmental management responsibilities that have been delegated to various offices within the BLM.

B. The Branch of Environmental Coordination (within the Office of Planning, Inventory, and Environmental Coordination) serves as the Bureau focal point for all NEPA matters and provides advice to the Director and other Bureau decisionmakers on NEPA related activities. The Branch:

1. Monitors Bureauwide compliance with NEPA.

2. Develops policies and guidelines for ensuring that technical requirements of NEPA are included in Bureauwide planning and inventory processes.

3. Establishes and monitors procedures and standards for conducting environmental analyses and preparing environmental documents.

4. Reviews for NEPA compliance, all environmental documents prepared for approval at the Directorate level or above.

5. Serves as liaison with the Departmental Office of Environmental Project Review.

6. Receives, distributes, and reviews environmental documents referred by other Bureaus and Federal agencies; alerts BLM decisionmakers to documents that raise critical issues; and ensures Bureau environmental comments on them.

7. Provides NEPA-related assistance and guidance to all Headquarters Office and field elements of the Bureau for environmental document preparation and review.

The Branch, pursuant to 40 CFR 1506.6(e), receives (from other BLM offices) information useful for the production of status reports on elements of the NEPA process. It produces, for Bureau and Departmental attention, a periodic status report on environmental impact statements for which BLM has lead responsibility and for which BLM is a cooperating agency. Information for this report is received from Bureau offices having responsibility for particular environmental analyses and for providing particulars to interested persons concerning those analyses.

General statements concerning the Branch's delegated responsibilities for program development, technical development and service, administrative functions, and program operations are found in BLM Manual Section 1211.

.05 *Definitions.* See Glossary of Terms, Appendix B.

.06 *Policy.* The Environmental Protection and Enhancement System is used by BLM managers to carry out the following BLM policy:

A. Pursue the goals of NEPA as set forth in Section 101(b) of the Act (Appendix A).

The requirement to maintain and enhance long-term productivity and quality of the environment takes precedence over local, short-term usage. This policy recognizes the responsibility to future generations of those presently controlling the development of natural resources and the modification of the living landscape.

Although the influence of the U.S. policy will be limited outside of its own borders, the global character of ecological relationships must be the guide for domestic activities.

In meeting the objectives of environmental management, it will be necessary to seek constructive compromise and resolutely preserve future options.

B. Seek out, identify, adapt, and/or develop the best environmental analysis and management technology practicable. This must ensure a systematic, initerdisciplinary approach for integrating the natural sciences, the social sciences, and the environmental design arts within an ecosystem concept. It must also ensure the use of that technology for planning and decisionmaking.

C. Include methods and procedures for ensuring that presently unquantified environmental amenities and values will be given appropriate consideration in decisionmaking. It is BLM's policy that in environmental analysis, values that are essential for maintenance of living

systems (functional values) are to be given greater weight than values that are not essential to life support. Likewise, society's normative values (i.e., social norms that serve to guide, regulate, or control proper and acceptable social behavior) must be given greater weight in environmental analysis than values that represent only preferences of individuals, groups, or organizations (preference values).

D. Cooperate with States, counties, municipalities, institutions, and individuals in sharing advice and information useful in restoring, maintaining and enhancing the quality of the environment.

E. Recognize the worldwide and long-range character of environmental problems. Where consistent with foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment.

F. Develop alternatives that will better meet the public interest when an action proposed by an outside applicant does not.

.07 *Principles.* The preamble to this guidebook contains the principles on which this Environmental Protection and Enhancement System is based.

.08 *Program Decision Points.* Appendix 5 of Part 516 DM 6, Department of Interior Manual, specifies the program decision points.

.09 *System Overview and Coordination.* The BLM's Environmental Protection and Enhancement System enables BLM managers to bring together and integrate sound scientific thinking with practical applications of that thinking. The system encompasses many deverse procedures within a unified conceptual framework for making decisions affecting the quality of the environment.

Techniques for implementing the Environmental Protection and Enhancement System are described in the procedural sections of this guidebook series, Sections 1791 through 1798. These techniques provide a means for organizing and channeling professional expertise into more efficient and effective analyses and decisions.

A. *Description of the System.* The Environmental Protection and Enhancement System is made up of several components described in Sections .1 through .8. Chief among these is the environmental analysis and decisionmaking process diagrammed in Illustration 1. This process was developed specifically to comply with NEPA and the CEQ regulations on NEPA.

B. *Overview of the Environmental Analysis and Decisionmaking Process.* The environmental analysis and decisionmaking process consists of eight stages. Stages are expanded into major steps, decision points, and feedback loops (Illustration 1). Public involvement, mitigation, and monitoring are considered at several steps throughout the process. For a complete description, see Guidebook Section 1791.

*1. Stage 1—Management Screen.* The purpose of the management screen is to determine whether the proposal has enough detail to make a quick management decision or whether further analysis is necessary.

*Box 1.1—Provide Pre-proposal Assistance and Guidance.* The BLM is required to advise non-Federal applicants of studies or other information that might be required for reaching a decision.

*Box 1.2—Screen Proposal.* In addition to assisting and guiding the development of a proposal, the management screen provides a quick review of proposals for the following decisions.

*Decision Point 1A—EIS Required by Policy?* Is the proposal one that automatically requires an environmental impact statement (EIS) by BLM policy? This includes resource management plans, EIS's required by court decisions, and EIS's mandated by the Secretary. If an EIS is mandated by policy, an EIS is begun with preliminary analysis (Stage 2).

*Decision Point 1B—Categorical Exclusion?* If an EIS is not required by policy, the screen checks to see whether the proposal can be categorically excluded from further environmental analysis. If the proposal can be categorically excluded, a decision approving or disapproving the action can be made (Box 1.3). If not, a preliminary analysis is begun (Stage 2).

*Box 1.3—Document the Categorical Exclusion.* Document the categorical exclusion and decide whether to approve or disapprove the action (Decision Point 7A).

*2. Stage 2—Preliminary Analysis.* The purposes of preliminary analysis are (1) to determine whether alternatives have been analyzed elsewhere for environmental impacts; (2) to identify similar actions that have been analyzed in the same geographic area or in a similar environmental setting; and (3) for an EIS, to review existing information for a notice of intent to prepare an EIS (NOI).

*Box 2.1—Preliminary Scoping.* The manager appoints a team to identify potentially significant issues and to involve the public, as necessary. Another part of preliminary scoping is to review the proposal and existing data to reach the following decisions:

*Decision Point 2A—Detail Sufficient?* If the proposal is stated clearly and in enough detail to continue analysis, the team proceeds to decision point 2B. If not, the proposal is returned to its originator with specific information requirements needed to refine the proposal and continue analysis (Box 2.3).

*Decision Point 2B—Significant Impacts Likely?* The team uses several factors to determine whether significant impacts are likely to result from the proposal. If they are, preliminary analysis proceeds to decision point 2C. If not, it goes into an environmental assessment (EA) mode (Decision Point 2D).

*Decision Point 2C—Do EIS?* If significant impacts are likely to occur, the manager decides whether to eliminate or reduce the likelihood of significant impacts by refining the proposal (Box 2.3), or whether to continue analysis in an EIS mode (Decision Point 2E).

*Decision Point 2D—Previous Considerations Adequate?* If earlier considerations of similar proposals are still current and adequate for reaching a decision, the interdisciplinary team recommends an action to the decisionmaker (Box 2.2). If not, the team continues analysis for an EA (Stage 4).

*Box 2.2—Make Decision—Go to 7A.* If previous considerations are adequate, the decisionmaker can approve or disapprove the proposal (Stage 7) and document that decision.

*Decision Point 2E—Previous EIS(s) Adequate?* If the proposal has already been adequately covered in one or more previous EIS's, the manager can approve or disapprove the proposal (Stage 7) and document that dicision, referencing the earlier environmental documents in the record of decision. If not, an EIS is begun with an NOI (Box 3.1).

*Box 2.3—Refine Proposal.* The analysis team must specify what additional information is necessary for continuing environmental analysis. The proposal must be refined sufficiently to continue analysis and reach decisions.

*3. Stage 3—Scoping and Planning the Analysis.* Analysis for an EIS begins with scoping (1) to determine which issues or impacts arising from the proposal might be significant, and (2) to ensure that analysis identifies and addresses net impacts of the proposal. This is done by planning the analysis to fit the needs.

*Box 3.1—Notice of Intent for an EIS.* Analysis for an EIS can be started only

with the approval of the Director or his delegated representative, and after publication of an NOI in the Federal Register.

*Box 3.2—Scope the EIS.* Scoping is a formal process for involving the public to help (1) plan the environmental analysis; (2) identify reasonable alternatives; and (3) identify significant issues arising from alternatives.

*Box 3.3—Preparation Plan.* The preparation plan for an EIS focuses on significant issues raised during scoping and designs analysis around those issues.

*4. Stage 4—Analyzing Information Needs.* The purposes of this stage are (1) to determine information needs; (2) to screen and organize existing information; and (3) to get additional information, when necessary.

*Box 4.1—Screen and Organize Existing Information.* Information needs are determined by: (1) extent to which alternatives are likely to affect the environment, and (2) sensitivity of key ecosystem components and processes likely to be affected. Only those details important to the analysis are included. If these requirements are met, the interdisciplinary team can proceed with analyzing environmental consequences (Stage 5).

*Decision Point 4A—Information Adequate?* If any new concerns have been identified, the EA analysis must re-evaluate the information base. For an EIS, the same procedures are followed, but generally they are more detailed and require public involvement. If information is adequate, the process continues to stage 5.

*Decision Point 4B—Fieldwork Necessary?* If information is not adequate to analyze environmental impacts, fieldwork may be necessary (Box 4.2), or the analysis may require only a more thorough search and review of existing information (Box 4.1).

*Box 4.2—Design and Complete Fieldwork.* The purpose of fieldwork is to gether only enough information to complete analysis. The extent of field studies can vary tremendously, depending on information needs.

Box 4.3—Environmental Information System. The environmental information system will be more than an information storage and retrieval bank. The system will include bibliographies of environmental documents and records of decisions, and information and data on ecosystems from previous environmental analyses, field studies (Box 4.2), monitoring (Box 8.4), and other sources (Box 4.4).

*Box 4.4—Information from Other Sources.* As part of developing an environmental information system, it will be necessary to update the system with information and data from other sources. This box represents those activities, including input from continued public involvement (Box 4.5).

*Box 4.5—Continued Public Involvement.* BLM interacts with the public throughout the process. The magnitude of a proposal and its impacts will determine how much public involvement is needed.

*5. Stage 5—Analyzing Environmental Consequences.* The purposes of analyzing environmental consequences are (1) to analyze impacts for significance; (2) to develop new alternatives; (3) to develop measures to mitigate impacts, where possible, (4) to plan monitoring; and (5) to improve understanding of environmental systems.

*Box 5.1—Analyze Impacts.* Impact analysis works in conjunction with stage 4 to identify real issues and discover potentially significant environmental impacts. The analysis depends on working records developed in early stages. These records focus analysis on impacts and issues identified as major or potentially significant.

*Decision Point 5A—Information Adequate?* The interdisciplinary team must determine whether information is adequate to permit reaching a decision about impacts. If not, further review or fieldwork may be required (Decision Point 4B). If so, the team makes the following decisions:

*Decision Point 5B—Net Impacts Significant?* If net impacts are not significant, the team prepares an EA and FONSI (Box 5.2).

*Decision Point 5C—Impacts Adequately Addressed?* If significant impacts have been considered and addressed adequately, either by mitigation plans, by revisions in the proposal, or by identifying potential impacts, the team finishes analysis and drafts an EIS (Box 5.2). If not, the manager considers whether to reject the proposal or have it refined (Decision Point 5D).

*Decision Point 5D—Reject Proposal?* After the analysis, because of severe environmental impacts, a manager may wish to disapprove a proposal without preparing an environmental document. If so, he makes that decision (Stage 7). If the manager decides that the proposal should be further refined, he returns it (Box 2.3).

*Box 5.2—Draft Environmental Document(s).* An EA may consist primarily of working records developed during analysis. A FONSI is then written that either summarizes the EA or includes the EA as an attachment. For an EIS, working records from analysis can be used to support findings and conclusions in the EIS.

*6. Stage 6—Public Comment and BLM Response.* The purposes of seeking and responding to public comment are (1) to seek comment on BLM's analysis, and (2) to arrive at equitable decisions, based in part on that comment.

*Box 6.1—Circulate Environmental Documents and Respond to Public Comment.* Requirements for filing and circulating environmental documents vary. BLM response will be determined by the nature of public comment.

*Decision Point 6A—Response to Public Adequate?* Responding to public comment might be a matter of minor revisions before a decision is reached, in which case the process continues to stage 7. However, if a more and more detailed response is required, parts of the analysis may need to be repeated (Box 6.2).

*Box 6.2—Revise Analysis and Environmental Documents, as Necessary.* This procedure "feeds back" to previous stages in the process. Public review may require a decisionmaker to re-evaluate the conclusions of an environmental document and revise an EA or EIS.

*7. Stage 7—Reaching and Recording Decision.* The purpose of this stage is to identify the point at which a manager must reach and record a decision, based on the analysis. The decision includes any necessary mitigation and monitoring plans that will be implemented.

*Decision Point 7A—Approve Proposal?* This decision point occurs after determining that the proposal is categorically excluded (Box 1.3), after reviewing previous analyses (Box 2.2), or after completing a new environmental analysis. The manager must record approval or disapproval (Boxes 7.1 or 7.2).

*Box 7.1—Record Approval.* For an EA and FONSI, the decision to proceed can be a simple cover letter with EA and FONSI attached. A more formal procedure is required for a record of decision in cases requiring EIS's.

*Box 7.2—Record Disapproval.* The principles for recording a decision to approve a proposal also apply to recording disapproval of a proposal.

*8. Stage 8—Implementing the Decision.* The purposes of implementing the decision (including any necessary mitigation and monitoring) are (1) to complete the action while minimizing adverse environmental effects, and (2) to provide information for future environmental analyses.

*Box 8.1—Proceed with Implementation and Initial-Phase Monitoring.* Establish a schedule for implementing the action and, where

necessary, a schedule for monitoring. Initial phases of the action can be such activities as clearing and grading, excavating, construction, or similar activities that are short-term as opposed to longer-term operational or environmental recovery and rehabilitation phases.

*Decision Point 8A—Mitigation Adequate?* Determine whether mitigation measures have been implemented and are working as prescribed. Information gained here may help develop or modify a long-term monitoring program (Box 8.3). Information about the adequacy of mitigation will be used to improve future environmental analyses and decisions (Box 8.4).

*Box 8.2—Modify Proposal—Go to 2.3.* If mitigation proves inadequate during initial phases, or if significant, unexpected long-term impacts occur, the action may be modified to mitigate or rehabilitate unforeseen impacts. The extent to which the BLM can modify a decision depends on whether the proposal originated inside or outside the Bureau and whether a contract contains stipulations that permit modifications. It also depends on enforcement authority and availability of funds and manpower.

*Box 8.3—Continue review and monitoring.* After initial phases of an action are complete, environmental impacts may be reviewed periodically to determine whether further mitigation and/or monitoring are required. This information could lead to modifying the action (Box 8.2), or it could be stored in the environmental information system (Box 8.4), or both.

*Box 8.4—Store Impact Information—Go to 4.3.* Useful information on impacts, mitigation measures, and monitoring will be stored in the environmental information system (Box 4.3) for use in future environmental analyses.

C. *Relationships Between the Environmental Protection and Enhancement System and Other BLM Functional and Management Systems.* The EPES is described as a complete system. It is used *in* planning and decisionmaking as required by NEPA Section 102(2)(A). Other BLM functional and management systems also impact BLM decisions. The EPES is designed to link with those systems at key planning and decisionmaking points to ensure that plans and decisions are made in full compliance with NEPA. In some cases the requirements of the EPES will be met by steps in these other systems and joint documentation is possible. There is no intent to duplicate other systems; there is intent to prescribe standards to be met at specific steps in the analysis and decisionmaking process

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The following sections briefly describe other guidebooks in the 1790–1799 series.

*.1 Environmental Analysis and Decisionmaking Process.* Guidebook 1791 describes operational procedures for the environmental analysis and decisionmaking process.

*.2 Environmental Documents.* Guidebook 1792 describes the procedures by which environmental documents are prepared.

*.3 Lead Agency (Or Sub-Unit) Determination and Predecision Referrals.* Guidebook 1793 describes how to determine lead and cooperating agencies and their respective responsibilities, including referrals.

*.4 Decision Criteria, Records, and Implementation.* Guidebook 1794 contains three major sections. The first describes criteria for assisting decisionmakers in attaining NEPA goals and other environmental values. The second provides methods for documenting differnt types of environmental decisions during scoping and analysis. The third discusses when implementation can legally begin and how implementation can be modified, when necessary, due to unforeseen serious environmental impacts.

*.5 Monitoring.* Guidebook 1795 identifies different types of monitoring and how monitoring is used for quality assurance and environmental protection and enhancement.

*.6 Ecosystem Modeling.* Guidebook 1796 reviews modeling procedures currently used for environmental analysis, protection, and enhancement. It develops procedures for computer-based optimization, simulation, and other modeling techniques that can be used in conjunction with the BLM strategic information system.

*.7 Review of Non-BLM Environmental Documents.* Guidebook 1797 will establish (1) policies regarding BLM's review of other agency environmental documents, (2) procedures for dealing with the Department Office that coordinates reviews and procedures governing the availability of review comments.

*.8 Environmental Knowledge and Awareness.* Guidebook 1798 will develop procedures for establising and operating an "environmental experience bank" for filing, storing, retrieving, disseminating, and sharing data and information in environmental documents.

.9 [Reserved]

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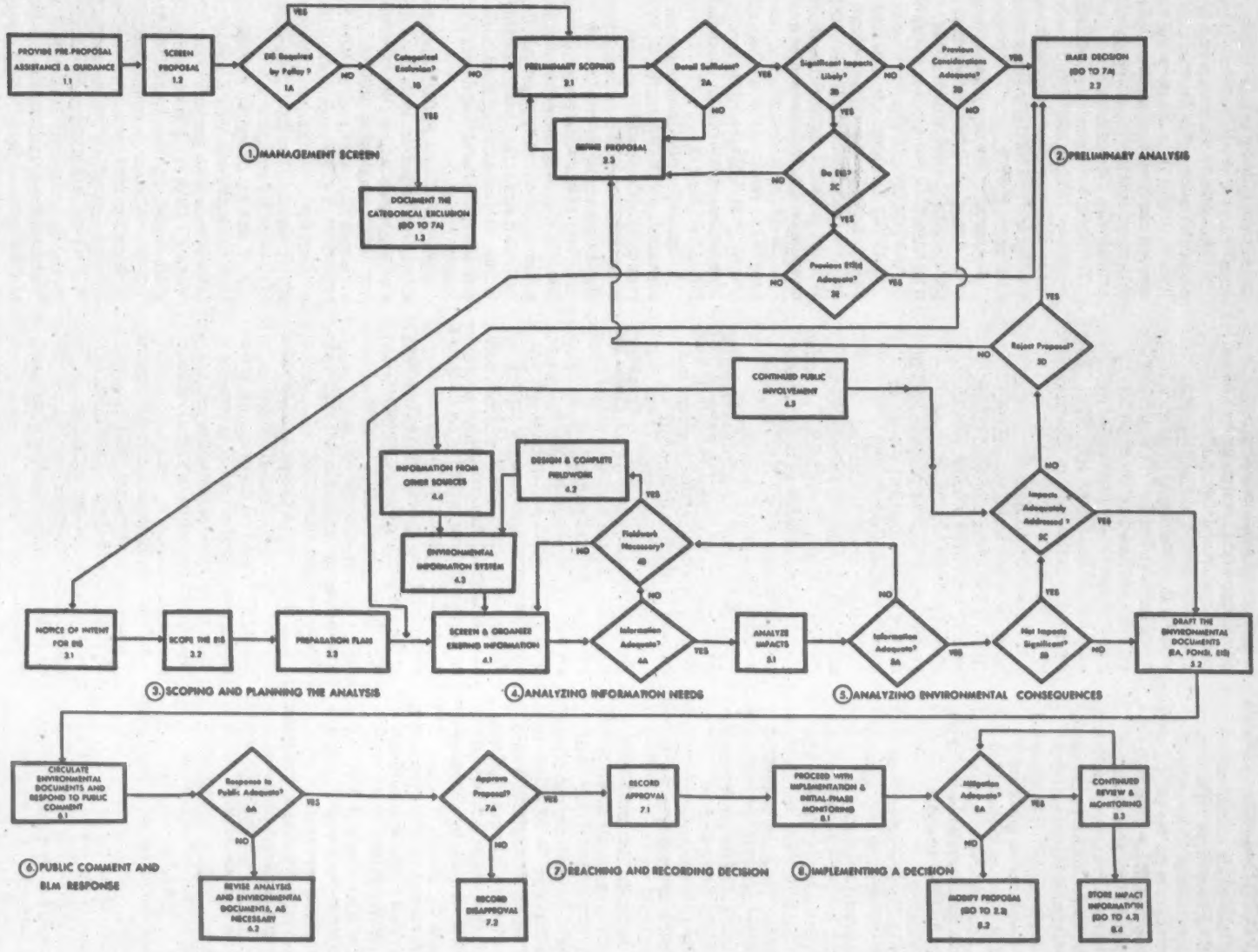
ILLUSTRATION 1

ENVIRONMENTAL ANALYSIS AND DECISIONMAKING PROCESS


PROVIDE PRE-PROPOSAL ASSISTANCE & GUIDANCE 1.1
SCREEN PROPOSAL 1.2
EIS Required by Policy? 1A
Categorical Exclusion? 1B
DOCUMENT THE CATEGORICAL EXCLUSION (GO TO 7A) 1.3
1. MANAGEMENT SCREEN
PRELIMINARY SCOPING 2.1
Detail Sufficient? 2A
REFINE PROPOSAL 2.3
Significant Impacts Likely? 2B
Previous Considerations Adequate? 2B
MAKE DECISION (GO TO 7A) 2.2
Do EIS? 2C
Previous EIS(s) Adequate? 2E
2. PRELIMINARY ANALYSIS
Reject Proposal? 3D
CONTINUED PUBLIC INVOLVEMENT 4.5
INFORMATION FROM OTHER SOURCES 4.6
DESIGN & COMPLETE FIELDWORK 4.2
ENVIRONMENTAL INFORMATION SYSTEM 4.3
Fieldwork Necessary? 4B
Impacts Adequately Addressed? 5C
NOTICE OF INTENT FOR EIS 3.1
SCOPE THE EIS 3.2
PREPARATION PLAN 3.3
SCREEN & ORGANIZE EXISTING INFORMATION 4.1
Information Adequate? 4A
ANALYZE IMPACTS 5.1
Information Adequate? 5A
Net Impacts Significant? 5B
DRAFT THE ENVIRONMENTAL DOCUMENTS (EA, FONSI, EIS) 5.2
3. SCOPING AND PLANNING THE ANALYSIS
4. ANALYZING INFORMATION NEEDS
5. ANALYZING ENVIRONMENTAL CONSEQUENCES
CIRCULATE ENVIRONMENTAL DOCUMENTS AND RESPOND TO PUBLIC COMMENT 6.1
Response to Public Adequate? 6A
REVISE ANALYSIS AND ENVIRONMENTAL DOCUMENTS, AS NECESSARY 6.2
6. PUBLIC COMMENT AND BLM RESPONSE
Approve Proposal? 7A
RECORD DISAPPROVAL 7.2
RECORD APPROVAL 7.1
7. REACHING AND RECORDING DECISION
PROCEED WITH IMPLEMENTATION & INITIAL PHASE MONITORING 8.1
Mitigation Adequate? 8A
MODIFY PROPOSAL (GO TO 2.2) 8.2
CONTINUED REVIEW & MONITORING 8.3
STORE IMPACT INFORMATION (GO TO 4.3) 8.4
8. IMPLEMENTING A DECISION

*This flow chart illustrates the analysis process and does not relate specifically to documentation. For example, final EISs and final EAs are prepared in box 6.2.

BILLING CODE 4310-84-C

**Appendix A (1790) Environmental Goals**

Environmental goals are normative values codified by statute, regulation, or executive action. Specific sources of environmental goals for the BLM are (1) two mission-oriented acts, the Federal Land Policy and Management Act of 1976 (FLPMA) and the Outer Continental Shelf Lands Act (OCSLA), as amended, and (2) the National Environmental Policy Act of 1969 (NEPA), as amended. Although environmental goals are established in other legislation (See Guidebook Section 1790.03), these acts constitute the fundamental basis for the BLM's environmental analysis responsibilities.

Goals define the desired state or condition that a resource management policy or program is designed to achieve. They sometimes conflict, and they usually are not quantifiable. The goals from NEPA, FLPMA, and OCSLA are listed below. They can be divided into three categories: (1) Goals primarily concerned with using the environment; (2) Goals for preserving and/or protecting the environment; and (3) Goals for health and safety in the environment.

*1. NEPA Goals.* Section 101(b) of NEPA lists six broad goals that can be separated into 20 discrete, individual goals that form the basis for complying with NEPA. These are listed below, by category, along with sample questions that can be asked (or answered) during scoping and other public involvement to determine how well any particular goal is being attained.

*A. Goals for Using the Environment.* 1. *Attain the widest range of beneficial uses of the environment without unintended consequences.* [NEPA 101(b)(3)] What is the probability of unintended consequences (i.e., unforseen adverse impacts) occurring as a result of implementing a proposed action?

2. *Attain the widest range of beneficial uses of the environment without undesirable consequences.* [NEPA 101(b)(3)] Are undesirable consequences associated with any of the proposed uses?

3. *Attain the widest range of beneficial uses of the environment without degradation.* [NEPA 101(b)(3)] Will a proposed action maintain or limit uses that the area can be put to? Will a new use (e.g., coal mining result in environmental degradation?

4. *Achieve a balance between population and resource use which will permit high standards of living.* [NEPA 101(b)(3)] Are population levels being increased? How will the standard of living be affected?

5. *Achieve a balance between population and resource use which will permit a wide sharing of life's amenities.* [NEPA 101(b)(3)] is the socially disadvantaged person's life being improved or further degraded? Will the proposed action close off resource use to any segment of the public or make it more difficult for that segment to participate, or vicariously enjoy, the resource?

6. *Assure for all Americans productive surroundings.* [NEPA 101(b)(3)] Will the proposed action remove land from productivity, change type of productivity, or increase productivity? Will the proposed action change the environment enough to impede human productivity?

7. *Assure for all Americans aesthetically pleasing surroundings.* [EPA 101(b)(2)] Will the proposed action change visual or other sensory aspects of the landscape? If so, how? IN what manner? Who does it affect?

8. *Assure for all Americans culturally pleasing surroundings.* [NEPA 101(b)(2)] Will the proposed action preserve our cultural heritage or degrade it?

B. *Goals for Preserving and/or Protecting the Environment.* 1. *Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.* [NEPA 101(b)(1)] Will the proposed action protect or improve the environment? Whose environment, in what ways, and to what degree? Are critical environmental concerns (e.g., wilderness values) being protected, impaired, or destroyed? Are options for various uses of the environment being preserved? Will the proposed action impose disadvantages on succeeding generations by limiting their choices of alternative resource uses?

2. *Preserve important natural aspects of our national heritage.* [NEPA 101(b)(4)] What will the proposed action do for natural values, such as pristine areas or values and resources unchanged by technology, synthetics, etc.?

3. *Preserve important cultural aspects of our national heritage.* [NEPA 101(b)(4)] Could the proposal effect cultural traits that are not fully apreciated at the local level, but which contribute to understanding of national heritage?

4. *Preserve important historic aspects of our national heritage.* [NEPA 101(b)(4) What historic aspects are being preserved, and of what important are they?

5. *Maintain an environment which supports diversity.* [NEPA 101(b)(5)] Is the proposal developing a monoculture, or is it diversifying potential uses of an area?

6. *Maintain an environment which supports variety of individual choice.* [NEPA 101(b)(4)] Is the proposal slanted toward use by only a certain type of person, or is it making a variety of uses available to the entire public?

7. *Enhance the quality of renewable resources.* [NEPA 101(b)(6)] How are renewable resources being affected? Are quality and productivity being enhanced and/or improved?

8. *Approach the maximum attainable recycling of depletable resources.* [NEPA 101(b)(6)] Are uses of the nonrenewable resources irreversible? If so, to what extent?

C. *Goals Relating to Health and Safety.* 1. *Assure for all American healthful surroundings.* [NEPA 101(b)(2)] Will the project improve unhealthful conditions, e.g., improve water quality?

2. *Attain the widest range of benefical uses of the environment without risk to health.* [NEPA 101)b)(3)] Do any proposed uses involve an immediate or future health risk?

3. *Assure for all Americans safe surroundings.* [NEPA 101(b)(2)] Will the proposed action create unsafe conditions, to what extent, and how significant are those conditions?

4. *Attain the widest range of beneficial uses of the environment without risk to safety of people.* [NEPA 101(b)(3)] Are safety hazards being increased over existing conditions in order to obtain additional uses of the environment?

*2. FLPMA Goals.* FLPMA states: "In managing the public lands the Secretary shall by regulation or otherwise take any action required to prevent unnecessary or undue degradation of the lands and their resources or to afford environmental protection" [Section 603(c); also Section 302(b)]. Specifically, FLPMA requires that:

A. *Goals for Using the Environment.* 1. *Goals and objectives be established by law as guidelines for public land use planning.* [102(a)(7)] These are stated at various places throughout FLPMA itself.

2. *Management be on the basis of multiple use and sustained yield, unless otherwise specified by law.* [102(a)(7)] Will a proposal utilize public lands and resources in the combination that will best meet the present and future needs of the American people? Will a proposal make the most judicious use of the land for some or all resources, or related services, over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions? Will some land be used for less than all of its resources? Does the proposal combine

balanced and diverse resource uses? Does it consider long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values? Will the proposed action provide harmonious and coordinated management of resources without permanently impairing productivity of the land and quality of the environment? Is consideration being given to relative values of resources, and not necessarily to the combination of uses that will give the greatest economic return or greatest unit output?

3. *The public lands be managed in a manner which recognizes the Nation's needs for domestic sources of minerals, food, timber, and fiber from the public lands* including implementation of the Mining and Minerals Policy Act of 1970 as it pertains to the public lands. [102(a)(12)] How do proposed uses relate to the Nation's needs?

4. *The public lands be managed in a manner that will provide food for fish and wildlife and domestic animals.* [102(a)(8)] what changes will there be in food availability for fish and wildlife or in domestic forage?

5. *The public lands be managed in a manner that will provide habitat for fish and wildlife and domestic animals.* [102(a)(8)] What changes will occur in fish and wildlife habitat? Habitat for domestic animals?

6. *The public lands be managed in manner that will provide for outdoor recreation and human occupancy and use.* [102(a)(8)] How do proposed uses provide for outdoor recreation, human occupancy, and other human uses?

B. *Goals for Preserving an Protecting the Environment.* 1. *The public lands be managed in a manner that will protect the quality of scientific values.* [102(a)(8)] How will proposed uses protect scientific values?

2. *The public lands be managed in a manner that will protect the quality of scenic values.* [102(a)(8) How will scenic values be protected?

3. *The public lands be managed in a manner that will protect the quality of historical values.* [102(a)(8)] How will historical values be protected?

4. *The public lands be managed in a manner that will protect the quality of ecological values.* [102(a)(8)] How will ecological values be protected?

5. *The public lands be managed in a manner that will protect the quality of environmental values.* [102(a)(8)] How will other environmental values be protected?

6. *The public lands be managed in a manner that will protect the quality of air and atmospheric values.* [102(a)(8)] How will air quality be protected?

7. *The public lands be managed in a manner that will protect the quality of water resources values.* [102(a)(8)] How will water quality be protected?

8. *The public lands be managed in a manner that will protect the quality of archeological values.* [102(a)(8)] How will archeological values be protected?

9. *The public lands be managed in a manner that, where appropriate, will preserve and protect certain public lands in their natural condition.* [102(a)(8)] Can any portion of land area to be affected by proposed action be preserved in its natural condition and protected?

10. *Regulations and plans for the protection of public land areas of critical environmental concern be promptly developed.* [102(a)(11)] This is being done, herein, and by BLM regulations and plans for "special areas".

3. *OCSLA Environmental Goals.* The OCSLA goals related to the environment are found in several places throughout the Act. In addition to goals specified below, the Act requires leasing programs to include conducting "environmental studies and prepare any environmental impact statement required in accordance with this Act and with section 102(2)(c) of NEPA". [OCSLA 208, Sec. 18(b)(3)].

A. *Goals for Using the Environment.* 1. Preserve, protect, and develop oil and natural gas resources in the OCS in a manner consistent with the need to balance orderly energy resource development with protection of the human, marine, and coastal environments. [OCSLA 102(2)(B)]

2. Encourage development of new and improved technology for energy resource production which will eliminate or minimize risk of damage to the human, marine, and coastal environments. [OCSLA 102(3)]

3. Manage the Outer Continental Shelf to consider economic, social, and environmental values of renewable and nonrenewable resources contained in the OCS, and the potential impact of oil and gas exploration on other resource values of the OCS and the marine, coastal, and human environments. [OCSLA 208, Sec. 18(a)(1)]

4. In timing and locating exploration, development, and production of oil and gas among the oil- and gas-bearing physiographic regions of the OCS, consider (1) geographical, geological, and ecological characteristics among the regions; (2) an equitable sharing of developmental benefits and environmental risks among the various regions; (3) the relative environmental sensitivity and marine productivity of different areas of the OCS; and (4) relevant environmental and predictive information for different areas of the OCS. [OCSLA 208, Sec. 18(a)(2)(A, B, G, & H)]

5. To the maximum extent practicable, select timing and location of leasing so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone. [OCSLA 208, Sec. 18(a)(3)]

B. *Goals for Protecting and Preserving the Environment.* 1. Provide regions impacted by OCS oil and gas exploration, development, and production with comprehensive assistance in order to anticipate and plan for such impact, and thereby assure adequate protection of the human environment. [OCSLA 102(4)]

2. Consider and recognize the rights and responsibilities of all States and local governments, where appropriate, to preserve and protect their marine, human, and coastal environments through such means as regulation of land, air, and water uses, of safety, and of related development and activity. [OCSLA 202(5)]

3. Minimize the likelihood of occurrences that may cause damage to the environment or to property, or endanger life or health. [OCSLA 202(6)]

## Guidebook Section 1791

### Environmental Analysis and Decisionmaking Process

Chapter 1—Introduction.....1
Chapter 2—Steps in the Process.....2
1. Stage 1—Management Screen.....2
2. Stage 2—Preliminary Analysis.....2
3. Stage 3—Scoping and Planning the Analysis.....7
4. Stage 4—Analyzing Information Needs.....11
5. Stage 5—Analyzing Environmental Consequences.....13
6. Stage 6—Public Comment and BLM Response.....16
7. Stage 7—Reaching and Recording Decision.....17
8. Stage 8—Implementing the Decision.....17
Chapter 3—Documentation.....20

*Illustrations*

Appendix A—Determining Significance
Appendix B—Analyzing and Summarizing Impacts and Optional Part on Expected Impact Calculation
Appendix C—Determining Reasonable Alternatives
Appendix D—Checklist for Environmental Analysis

## Chapter 1—Introduction

Environmental analysis and decisionmaking is a single process

applied with different degrees of intensity. The process is conducted in eight major stages, each containing one or more steps and decision points (Illustration 1).

The process can be adapted to the needs of a particular analysis *in that it requires only the information necessary to get the job done effectively.* Decision points determine whether steps have been completed adequately. When they have, the analysis proceeds rapidly through decision checkpoints. If not, the analysis returns to an earlier stage for clarification or information necessary to proceed. When the analysis returns to an earlier stage, it repeats all decision points. Time and effort needed to repeat a step will vary, but will usually be much less than required the first time through.

Because of these built-in "feedback mechanisms," analysis can be started as late as the fifth stage (e.g., for a resource management plan). Incomplete or inadequate information will require gathering additional information or refining a proposal, as necessary. Used this way, the process can be adapted to the Bureau's planning process for developing resource management plans.

The environmental analysis and decisionmaking process provides managers with a thorough, systematic set of procedures for reaching environmental decisions efficiently, while making certain that significant issues are not overlooked. ("Environmental impact analysis"as used here is really an estimate of *potential* impacts.)

Where impacts are not expected to be significant, procedures allow the environmental analysis team to analyze the situation quickly, draft an environmental assessment (EA), and use the EA to write a finding of no significant impacts (FONSI) with a minimum amount of documentation. Where potential impacts are expected to be significant, the team performs an analysis commensurate with the complexity and degree of significance of the action and prepares an environmental impact statement (EIS).

Working records are used (1) to constitute a formal record verifying that all necessary activities were performed and (2) to support conclusions and decisions. Worksheets and matrices can also be incorporated directly into an environmental document to minimize necessary narrative and reduce the amount of text. These worksheets and matrices are the "tools" used in several of the eight stages for estimating impacts and determining significance.

## Chapter 2—Steps in the Process

The environmental analysis and decisionmaking process is carried out through the use of several "tools," such as, worksheets, matrices, and checklists, that provide a clear record of what was done and how decisions were reached. Because several of these tools are used at more than one stage in the process, they are explained in appendices. This chapter describes how and when to use them.

This process is comprehensive enough to handle a large, complex EIS. For simpler analyses, as most EA's are, many of the procedures may not be necessary. *Adapt the process to specific needs of a given analysis. Do only what is necessary to complete the analysis effectively and reach a sound decision.*

*1. Stage 1—Management Screen.* This stage provides a quick screen to determine whether (1) an EIS is required as a matter of policy, or (2) the proposal is a categorical exclusion. An interdisciplinary team is not needed to make these determinations. If there is any doubt whether the proposal is a categorical exclusion, further analysis is required. Decisions should be made at the lowest Bureau echelon feasible.

*1.1 EIS Required by Policy? (Decision Point 1A).* The Director, or his delegated representative, may decide that an EIS is required by policy. Beginning an EIS requires a preliminary preparation plan (Illustration 2), which is developed during preliminary analysis (Stage 2). If an EIS is not required by policy, the decisionmaker decides whether the action is categorically excluded.

*1.2 Categorical Exclusion? (Decision Point 1B).* If the action is categorically excluded from requiring further environmental analysis, go directly to Stage 7. Document the decision to approve or deny the action in a record of decision. A list of categorical exclusions is provided in Departmental Manual Part 516 DM 6 and Appendix 5 of that manual. If the proposal cannot be categorically excluded, begin preliminary analysis.

*2. Stage 2—Preliminary Analysis.* Preliminary analysis determines the amount of environmental analysis necessary to reach an informed decision. Review existing information, and involve the public informally, as necessary. *Avoid unnecessary analysis and paperwork.*

This stage examines potentially significant issues from two perspectives: managerial and interdisciplinary. It allows the manager the option of requesting modification of a proposal *before* the interdisciplinary analysis. Preliminary analysis begins with preliminary scoping (Box 2.1).

*2.1 Preliminary Scoping (Box 2.1).* Preliminary scoping identifies potentially significant issues from both managerial and interdisciplinary perspectives. Use a management team (chief of resources, area manager, planning coordinator, environmental coordinator, district manager, etc., as necessary) to supply the managerial perspective. This team uses Worksheet 1 to identify potentially significant issues. If some are found that can be avoided by modifying the proposal, either have the proposal revised before proceeding, or forward the proposal with comments and worksheets to the interdisciplinary team for further analysis.

When identifying significant issues, first list all the concerns and questions that everyone has. Then, whenever possible, condense and consolidate two or more concerns into a single issue for analysis or Worksheet 1.

If an EIS is expected, gather enough information on alternatives and potentially significant impacts to develop a preliminary preparation plan (Illustration 2). Also keep in mind the NOI when reviewing the proposal and its potential impacts. This cuts down on work later when an NOI is drafted.

If an EA is expected, use preliminary scoping to review proposals, to make certain that alternatives are covered in enough detail, and to discover any unanswered questions about alternatives in preliminary scoping. Involve managerial staff as well as technical personnel.

For example, use staff meetings to brief people on new proposals requiring environmental analysis. Briefly describe each proposal and identify potentially significant issues that the action might create. If such concerns are raised, assign an *ad hoc* interdisciplinary team to explore those issues in more detail with the person responsible for the analysis. Disciplines involved should be relevant to the issues.

Use Section 3.3 as a guide and checklist of things to cover for this type of in-house preliminary scoping. *Do only what is required by the complexity of the problem.*

A. *Selecting an Interdisciplinary Team.* An interdisciplinary team consists of two or more individuals from different disciplines bring skills and experience to bear on the problem, *both individually and in joint effort.*

The content of the proposal will suggest the types of disciplines required to evaluate alternatives adequately. An interdisciplinary team should contain representatives from one or more disciplines within each of the following

broad categories: (1) natural sciences, (2) social sciences, (3) environmental design arts, and (4) ecological sciences, as necessary. Where this expertise is not available, consider bringing in expertise from outside the office.

Throughout preliminary analysis, both managers and the interdisciplinary team should be alert to opportunities for aggregating proposals or tiering the analysis.

*B. Aggregating Proposals.* Aggregation involves combining proposals for an integrated environmental analysis. Aggregation can (1) most accurately represent cumulative impacts; (2) make the most effective use of available manpower and funds; (3) reduce the number of EA's prepared; and (4) make the most effective use of the public's time and participation by avoiding unnecessary meetings.

Keep aware of proposals for concurrent or nearly concurrent activities by coordinating with others in your own and contiguous districts. Determine whether proposals: (1) are generally similar or share similar actions; (2) are located in the same geographical area; (3) will be implemented at or near the same time; (4) may result in cumulative impacts; or (5) set a precedent for future actions.

If any of these situations applies, consider aggregating proposals. In order to be considered for aggregation, however, proposals must be (1) complete enough to be analyzed, and (2) written at the same level of detail.

Where a number of activities are planned well in advance, aggregate proposals in the annual work plan (AWP). Plan one EA for several similar actions (i.e., combine several proposals within one EA if no significant impacts are expected). This uses manpower more efficiently.

Besides the AWP, check current management framework plans (MFP) and resource management plans (RMP) for actions that can be aggregated. Aggregate within resource programs, where possible. When new proposals or applications from outside the BLM come up during the year, use staff meetings and preliminary scoping to aggregate them also, whenever possible.

If impacts from a number of proposals are cumulatively significant, they *must* be analyzed in an EIS, unless all significant impacts will be sufficiently mitigated. This EIS may also include any related action that would normally be covered in an EA.

*C. Tiering.* Tiering means approaching analysis on a level that best fits a proposal. Normally tiering occurs from the top down, i.e., from broad, programmatic, mission-oriented national proposals through several levels, or tiers, to local, site-specific activities.

The Bureau has several established tiers of decisionmaking and related environmental analysis, which are to be observed. The highest level is Director and State Director policy development. This tier may be subdivided in various ways, depending on the subject matter involved. The next tier is land use planning as accomplished through transition period management Framework Plans (MFP), MFP amendments, or new Resource Management Plans (RMP). The third tier down is implementation planning. This may include activity or functional plans for specific programs. (Not all programs utilize activity plans.) In this lowest tier is, also, specific project design or action decisions.

CEQ regulations discuss tiering only in the context of an EIS (40 CFR 1500.4(i), 1502.4(d), 1502.20, and 1508.28). However, the concept is applicable and useful for the analysis needed for some EA's. Use those regulations as guidelines for scoping and planning environmental analyses at all levels. Specify the tier on which the analysis will focus.

*D. Public Involvement.* As part of preliminary scoping, the responsible BLM official may wish to inform the public that the Bureau is conducting an environmental analysis. This can be through personal contacts, notices in local media, and/or other means.

*2.2 Reviewing and Analyzing Existing Information.* As part of preliminary analysis, the interdisciplinary team examines earlier environmental documents, relevant reports, and scientific literature to determine (1) whether the proposed action and alternatives (or parts of them) have already been analyzed for environmental impacts, and (2) whether similar actions have occurred or been analyzed in the same geographic area, or in a similar environmental setting.

After reviewing relevant literature in their disciplines, team members meet again to determine whether previous considerations are adequate to recommend a decision about the proposal, as explained below.

The interdisciplinary team should: *A. Review Proposed Action and Alternatives.* Whenever possible, separate each alternative into major subactions, discrete activities, and their change agents. (See Appendix D.) Relate change agents to specific areas or sites on which the change agents will be active. Information should be complete enough for analysis (e.g., soil families, general slopes, aspects, major vegetative and/or community types, possibilities of endangered species, major animals and habitat types).

Return the proposal for refinement if deficiencies exist (Box 2.3). If information is adequate, use Worksheet 1 to identify potentially significant issues, particularly from the perspective of ecosystem functional values.

*B. Search and Review Other Information.* Search files, libraries, and other sources to locate analyses and monitoring data on similar actions, subactions, activities, and change agents in similar environmental settings. Look for existing EA's and EIS's covering any portion of an alternative.

These earlier documents may (1) provide baseline data from which to measure impacts and (2) give the team clues to mitigating measures. Incorporating mitigating measures that eliminate significant impacts could result in the need for only an EA and FONSI, instead of an EIS. In this type of situation, the proposal is further refined to include the mitigation (Box 2.3).

*C. Analyze Data Applicability.* Analyze each change agent's effect on components and processes of the ecosystem (including man as component). Determine whether existing documents are adequate. Look for portions of existing documents that assess probable impacts. Use Worksheet 2 to summarize existing information from these documents whenever data from previous studies are applicable.

When significant issues are considered in earlier documents, record all relevant issues on Worksheet 1. Reference all sources in footnotes. This narrows the scope required analysis to only those actions, subactions, and activities not adequately covered by previous considerations.

*2.3 Identifying Potentially Significant Issues.* If an EIS is not required by policy or other mandate, the decisionmaker must decide whether other factors warrant an EIS. This decision is make through the interaction of Decision Points 2A, 2B, and 2C. Qualitative estimates of likelihood are used to focus further analysis on potentially significant impacts: The *qualitative* cut tells us what to analyze *quantitatively.*

*A. Detail Sufficient? (Decision Point 1A).* If the proposal lacks enough detailed information to continue through Decision Points 2B, 2C, and/or 2D, the team specifies what information is needed for further analysis and recommends that the proposal be refined (Box 2.3).

*B. Significant Impacts Likely? (Decision Point 2B).* At this point in the analysis, Worksheet 1 is used to

determine (1) whether any issues have priorities 1, 2, or 3 (and possibly 4); and (2) whether any thresholds having these priorities are likely to be exceeded. (See Appendix A.) If the proposed action and alternatives are not clearly enough defined to make these determinations, return the proposal for clarifications and refinement (Box 2.3).

Any proposal generating issues with a (1) 1, 2, or 3 priority, and (2) a category A likelihood of exceeding related thresholds must go through Decision Point 2C. All others *may* go through Decision Point 2D for further analysis, with one exception:

Priority 4, category A, is designed to allow a decisionmaker some discretionary judgment. In some cases where likelihood is high, the decisionmaker may wish to consider doing an EIS (Decision Point 2C) or continuing the analysis for an EA at this time (Decision Point 2D), depending on many factors. (See Appendix A.)

*C. Do EIS? (Decision Point 2C).* If likelihood is high that priority 1, 2, or 3 (and sometimes 4) thresholds will be exceeded, the manager should either recommend an EIS immediately, or return the proposal for refinement (Box 2.3.). In this situation, refinement means modifying the proposal to reduce the likelihood of exceeding any threshold having priority 1, 2, or 3 (and possibly 4).

*2.4 Previous Considerations Adequate? (Decision Point 2D).* If analysis is to continue in an EA mode, review potentially significant issues recorded on Worksheet 1. The priorities, thresholds, and likelihoods will determine how to continue. Analyze all issues *except* where thresholds with priorities 2 through 5 have a negligible likelihood of occurring (Category C).

If similar proposals have been analyzed in similar locations and no significant impacts were predicted, preliminary analysis should assure that previous analyses, or relevant portions of them, still apply. If they apply, the environmental documents can incorporate these previous considerations by reference. Be sure to explain how and why the previous analyses apply to the proposal.

After reviewing existing information about similar actions, ask whether (1) the proposal itself (or portions of it) has been considered previously, and (2) that consideration is still current.

If the proposal has been analyzed in an EA or an EIS and the information is adequate, in terms of scope, specificity, and currency, the team informs the manager about these previous considerations. When parts of a proposal have been adequately covered previously, the team specifies the acceptable previous considerations and identifies those parts of the proposal that still must be analyzed. Include complete references of documents cited, with relevant page numbers.

When previous considerations are adequate, the decisionmaker can approve or disapprove the action based on those considerations (Box 2.2). If the proposal is not fully covered by adequate previous analyses, the interdisciplinary team moves into Stage 4, focusing the information search *only* on issues and impacts not covered adequately elsewhere.

*A. Make Decision (Box 2.2).* If the manager decides a proposal is adequately covered by previous considerations, he skips to Stage 7.

*B. Return Proposal to Team.* If the manager decides previous considerations are not adequate, he/she returns the proposal to the team for further analysis on any portions requiring it (Stage 4).

*2.5 Previous EIS(s) Adequate? (Decision Point 2E).* If analysis is to continue in an EIS mode, the team should check for the possibility that the proposal might have been covered in one or more previous EIS's. If so, the manager can make a decision (Stage 7) and incorporate the previous EIS's by reference in the record of decision. If not, the manager recommends an EIS. (When parts of a proposal have been analyzed adequately in previous EIS's, those parts can be incorporated by reference later in the new EIS).

*3. Stage 3—Scoping and Planning the Analysis.*

*3.1 Procedures.* Formal scoping is required only for an EIS. When significant impacts are found, an EIS is required by CEQ's NEPA regulations. However, the Director must aprove, or have delegated approval for, starting analysis for any EIS. The responsible official requests permission from the Director, or his delegated representative, to begin analysis for an EIS. This request must be accompanied by a preliminary preparation plan.

*A. Preliminary Preparation Plan.* When an EIS is anticipated, preliminary analysis is used to develop a preliminary preparation plan (Illustration 2). If information is not sufficient to develop an adequate preliminary preparation plan, return the proposal for further refinement (Box 2.3). The main purpose of the preliminary preparation plan is to organize background work that has already been done and provide the Director, or his delegated representative, information needed to approve the EIS. Issues determined to be significant by the Bureau are emphasized.

The preliminary preparation plan is a working document that undergoes substantial changes during scoping. The preliminary plan does not require Washington Office approval.

*B. Mandated EIS's.* When an EIS is required by court order or by a Secretarial decision, and authority for approval is with the Director, or above, a preliminary preparation plan is prepared and sent to the responsible Washington Office program staff for comments and information purposes before filing an NOI and beginning scoping. The purpose of the comments is not to revise the plan, but to provide advice on alternatives, the NOI, and scoping. For EIS's delegated to State Directors, the preliminary preparation plan is sent to the Washington Office at the time the NOI is filed.

*3.2 Notice of Intent (Box 3.1).* Publication of a notice of intent to prepare an EIS begins formal scoping. Two main purposes of an NOI are (1) to notify persons or agencies interested in, or affected by, a proposed Federal action, and (2) to seek information and/or participation in scoping by potentially affected interests. The NOI is explained in CEQ's regulations (40 CFR 1501.7, 1507.3(e), and 1508.22).

The NOI should include:

A. Description of the proposed action and alternatives, including purpose of, and need for, the proposed action.

B. Identification of the geographic area to be impacted.

C. Significant issues identified by the Bureau.

D. Description of the scoping process to be used, including:

1. Kind and extent of public involvement planned.

2. Times, dates, and locations of scheduled or anticipated public meetings, hearings, or other similar gatherings.

E. Name, title, address, and telephone number of Bureau officials who may be contacted for additional information.

F. Location and availability of documents relevant to the proposal and the EIS.

*3.3 Scoping the EIS (Box 3.2).* The overall purposes of scoping are (1) to identify significant issues resulting from the proposal, (2) to prioritize those issues, (3) to determine the scope of issues to be analyzed in detail for the EIS, and (4) to set criteria for developing an environmentally preferable alternative. The NOI identifies potentially significant issues so the public can more readily determine whether they are interested in, or affected by, the proposal.

*A. Scoping Tasks.* Scoping accomplishes a number of specific tasks

(40 CFR 1501.7), which should be documented in the preparation plan. This section summarizes six tasks. Section B explains the tasks in detail.

1. Determine the scope (40 CFR 1508.25) of the analysis and the significant issues to be analyzed in depth in the EIS.

2. Identify and eliminate from detailed study issues determined during scoping not to be significant and issues covered by prior environmental review.

3. Identify reasonable alternatives and eliminate from detailed study alternatives that are not reasonable. (*Note:* Try to get consensus, but this is not necessary.) Also identify any issues generated by new alternatives.

4. Allocate assignments for preparation of the EIS among lead and cooperating agencies.

5. Identify relevant EA's and other EIS's that are being prepared, or will be prepared, but which are not part of the scope of the EIS under consideration. Identify other environmental review and consultation requirements so that the lead and cooperating agencies may prepare other analyses and studies concurrently with, and integrated with, the EIS as provided in 40 CFR 1502.25.

6. Indicate the relationship between the timing of environmental analyses and the planning and decisionmaking schedule.

*B. Task Explanations.*

*1. Determining Significant Issues.* Scoping involves asking the public to identify issues not readily apparent during preliminary analysis (Stage 2) and determining which issues are significant. Appendix A explains how to use Worksheet 1 to determine significance.

*2. Eliminating Insignificant Issues.* Clearly identifying potentially significant issues allows the interdisciplinary team to focus analysis on those issues and avoids a "shotgun" approach to gathering basic data and analyzing issues that are not significant. It also eliminates unnecessary discussion in an EIS. However, analysis may include related issues, where appropriate.

*3. Identifying Reasonable Alternatives.* The main purposes of this task are (1) to insure that reasonable alternatives to the proposed action will be analyzed in detail in the EIS and (2) to minimize time devoted to analyzing alternatives that are not reasonable. This will be a complex task because what might seem reasonable to one individual or a group may be unreasonable to others. The test of reasonableness will depend on the values of those involved. Refer to Appendix C "Determining Reasonable Alternatives."

*4. Allocating EIS Assignments.* Lead and cooperating agencies must collaborate in preparing an EIS. This often involves a Memorandum of Understanding (MOU), (1) specifying each agency's responsibilities for preparing portions of the EIS, and (2) setting deadlines for getting them to the lead agency. The MOU should be signed as soon as possible so as not to delay the NEPA process.

When BLM is a cooperating agency, the MOU should insure that the Bureau will be able to share information and analysis from the environmental document, where applicable. The responsible Bureau office should also plan how to prepare BLM portions of the EIS. This may include a combination of in-house and contracted efforts.

*5. Including Other Analyses.* Contact other agencies to determine whether they are preparing, or will prepare, any EA's or EIS's (1) in the same geographic area as the proposed action, or (2) on interrelated or associated projects. When possible, involve agencies planning a later action that might be related to the proposal. (See 40 CFR 1502.4.) This will help reduce duplication of effort and provide the needed environmental information to Federal agencies and the public in one environmental document.

*6. Timing of Agency Action.* Developing a schedule for the EIS will facilitate public involvement at crucial times during analysis. Although the schedule can change owing to unforeseen circumstances, a schedule must be laid out.

*C. Scoping Techniques.* The scoping process for an EIS must be described in the NOI. Procedures used to involve various publics are diverse. Different levels of involvement are required at various stages in the environmental analysis and decisionmaking process. No single approach or format is universally successful. Detailed guidance is available in the Public Participation Guide (BLM Manual Section 1601, (Appendix 2).

Regardless of scoping format, however, use Worksheet 1 to summarize all potentially significant issues raised by the public. In some cases (e.g., a public meeting) it may be better to write issues on a blackboard or flip chart first. Often two or more issues can be consolidated into a single issue for further analysis on Worksheet 1.

*3.4 Preparation Plan (Box 3.3).* The purposes of the preparation plan (Illustration 3) are (1) to summarize scoping activities and (2) to define the scope of the EIS.

*A. Preparation Plan Components.* The preparation plan provides the basis for communication within the Bureau and between the Bureau, Department, and any other agency involved. It describes the nature and scope of the proposal and alternatives. It also provides needed information to Bureau decisionmakers on the use of available expertise and funds for EIS preparation.

*B. Review and Approval.* Where EIS filing authority has not been delegated to the State Directors, EIS preparation plans are submitted to Washington Office staff with program responsibility (Washington Management Staff). If there is a question about which staff is responsible, submit the plan to the Chief, Office of Planning, Inventory, and Environmental Coordination for resolution. Washington Office staffs reviewing preparation plans must complete review within timeframes established by the Washington Management Staff. Reviews are conducted primarily to determine whether the scope of the EIS should be approved. Comments on the preparation plan may include changes to the plan, comments about its implementation, or changes to the scope of the EIS.

For certain kinds of proposals (e.g. rangeland management and timber management), the Washington Management Staff may require more information on the proposal and alternatives than will normally be required in a preparation plan. This information must be provided before the preparation plan is approved.

Preparation plan approvals may include delegating authority to the State Director to file the EIS. Such delegation of authority will be based on factors including the experience and capability of the State Office staff to insure adequacy of the EIS. As State Offices gain more experience, filing authority may be delegated on a State-by-State basis for certain kinds of EIS's.

Where EIS filing authority has been delegated to the State Director, EIS preparation plans are generally reviewed at the State Office level. However, the Washington Office may review some preparation plans to monitor State Office NEPA compliance.

*4. Stage 4—Analyzing Information Needs.* Make certain there is enough information about the proposal, important or significant issues, and the environmental setting to analyze environmental consequences associated with alternatives.

Worksheets 1 and 2 are designed to help organize information compactly and efficiently during analysis and maintain a record of what was considered. Worksheet 1 provides a

starting point for organizing information by identifying significant issues and any missing information about those issues.

Worksheet 2 is designed to summarize several different impacts associated with a major activity or subactivity. It is used with checklists of change agents and impacts to identify direct and indirect (higher-order) impacts produced by alternatives. All anticipated impacts should be included, whether they are expected to be significant or not. If they are expected to be significant, use columns 12 and 13 to explain why. Link impacts to any significance thresholds established on Worksheet 1.

For an EIS, organize information around signficant issues, as identified on Worksheet 1. Issues having priorities 1, 2, and 3 must be analyzed in an EIS. (See Appendix A.) Issues having priorities 5 and zero, need only be analyzed in an EA. Issues assigned a moderate priority (4), may appear in both EA's and EIS's.

For an EA, begin analysis by focusing on issues identified on Worksheet 1. Include other issues as they are discovered during environmental analysis with Worksheet 2, no matter what their priority.

*4.1 Screen and Organize Existing Information (Box 4.1).* Potentially significant issues are identified on Worksheet 1, one issue per worksheet. Organize worksheets into categories according to component or process affected. This identifies which ecosystem components and processes are the focus of most concern, at least for an initial cut.

*A. Determine Information Needs.* Information necessary for impact analysis might not be available at this point. The first task in analyzing information needs is to compile a list of facts needed to continue analysis. This means identifying thresholds, baseline values, and other information required on Worksheet 1.

*B. Types of Information.* Each alternative in a proposal may be composed of several subactions, activities, and subactivities that produce primary change agents. (See Appendix D.) Use Worksheet 2 to identify impacts produced by change agents.

For example, on a large coal mine, one implementation stage might be construction, the second might be operation, and the third, rehabilitation and restoration. Each of these stages might involve building roads. Road construction consists of pretty much the same activities, regardless of the stage in which it occurs. The activities, in turn, consist of several subactivities, each of which produces one or more change agents.

Search proposals systematically for decision implementation stages, subactions, activities, etc., to identify all change agents that could produce potentially significant impacts. Although scoping identifies many of these, not all significant impacts are identified during scoping. Often impacts to functional values of the ecosystem will not be apparent until well into the analysis. Record on Worksheet 1 any potentially significant functional thresholds discovered during analysis.

Use information about the proposed action and alternatives to identify the affected environment. With known change agents in mind, look for key ecosystem components and processes that might be affected, but which were not identified during scoping.

*C. Sources of Information.* Information for the analysis can come from fieldwork, the public, the environmental information system, and other sources (Illustration 1).

The environmental information system (Box 4.3) is not a formal structured system at this time. It is a general term for bibliographies, other environmental documents, a data bank, scientific literature reference books, etc.

For an EA, very little extra work might be required in this stage beyond that completed during preliminary analysis (Stage 2). When information is organized as described above, impact analysis can begin immediately.

For either an EA or an EIS, ask: Is the information adequate to analyze impacts? (Decision Point 4A). If it is, the analysis continues. If not, fieldwork is considered (Decision Point 4B).

Where fieldwork is required, it must be carefully designed to get the most meaninful information. For a simple proposal, a one-day reconnaissance may be sufficient. A small team of individuals can visit an area, discuss the project on site, and reach conclusions about impacts quickly. In other cases, pilot studies may be required to get enough information simply to design more detailed studies on the ecosystem.

If extensive fieldwork is necessary to finish analysis, the action may also require monitoring. This should be considered when laying out study plots or designing other aspects of the field study. Use standard BLM field procedures, whenever possible.

Other sources of information (Box 4.4) include sources outside BLM. University professors and libraries are often excellent sources. Local historians, long-time residents, and sportsmen often have information that is not available anywhere else. A brief phone call can frequently provide direction that avoids hours of literature search. It often has the additional advantage of involving the public informally.

This continuing public involvement (Box 4.5) can be informal, as mentioned above, or it may require formal review of data and information throughout the analysis by varius affected interests and their representatives. Circulating copies of worksheets and early drafts of the analysis periodically may avoid unpleasant surprises during public review of environmental documents.

*5. State 5—Analyzing Environmental Consequences.*

This stage uses information organized in Stage 4, (1) to estimate environmental impacts; (2) to develop new alternatives, if necessary; (3) to develop mitigation measures for significant impacts, where feasible; and (4) to plan appropriate monitoring activities.

*5.1 Impact Analysis Process.* Analysis is focused on (1) impacts related to thresholds for issues listed on Worksheet 1, and (2) discovering new impacts (particularly on ecosystem functional values) that could raise other significant issues.

Impact analysis is handled largely through Worksheet 2. No matter how simple or involved the environmental analysis, Worksheet 2 should always be filled out as fully as possible *before any decision is made about going to the field.* Use information from preliminary analysis, scoping, existing literature, the proposal, and other sources. If this is done, field analysis is readily accomplished using Worksheet 2.

For instance, listing change agents in column 5 focuses analysis on impact-producting factors associated with each alternative. If column 5 is filled out before the team goes into the field, the team can concentrate on determining what impacts may be expected within their area of expertise as a result of those agents. They can use the worksheets directly as field sheets, recording their observations in a standard format as they move through a site. The worksheet also provides a focal point for on-the-spot team consultation as well as for further analysis at the office.

Different disciplines use different methods to estimate impacts. Whenever other worksheets, notes, references, or methods are used to derive impact estimates for Worksheet 2, attach these records to the record copy of Worksheet 2. This is particularly important for significant impacts or for documenting estimates on Worksheet 3. Where necessary for environmental documents, summarize in narrative text the procedures and rationale used to estimate an impact. Explanations must be clear and concise.

Use interdisciplinary analysis to identify mitigation and apply it to

impacts, whenever possible. This is particularly true of impacts likely to cross high-priority thresholds.

*A. Information Adequate? (Decision Point 5A).* Information must be adequate for conducting a thorough analysis. In particular, this means assigning meaningful quantitative probability estimates to any impacts associated with a 1, 2, or 3 (and possibly 4) threshold. Probabilities should also be assigned to other potential impacts, whenever possible, using Worksheet 2, or to a range of impacts, using Worksheet 3.

*5.2 Planning Necessary Monitoring.* Significance thresholds identified on Worksheet 1 provide targets for mitigating impacts. Where estimates of significant impacts are very uncertain or involve great risks, impacts and mitigation should be monitored. Monitoring should focus on key indicators.

For example, if the health of a deer herd is a significant issue, monitoring might involve looking at mean weight of animals harvested or fawn mortality. Monitor whatever gets the job done *effectively* at the lowest cost, while permitting comparision against baseline data. This is where field studies (Box 4.2) should be considered and designed in light of what might need to be monitored after an action is implemented.

*5.3 Summarizing and Comparing Impacts.* Appendix B describes how to use Matrix 1 to summarize impacts of an alternative. This matrix permits calculating cumulative impacts of different activities.

After Matrix 1 is completed, the comparison matrix (Matrix 2) must be developed. This presents environmental impacts of alternatives in comparative form in a single matrix. Significance thresholds are listed in a separate column, along with their priorities. This matrix provides the decisionmaker a succinct comparative format for objectively evaluating alternatives, making trade-offs, and reaching decisions quickly, openly, and effectively.

*A. Net Impacts Significant? (Decision Point 5B).* At this point in the analysis, potential impacts are summarized with their probabilities of occurring and, in the case of significant issues, any relevant thresholds and priorities. To determine whether any impact will be significant, the following criteria are suggested:

1. Any impact expected to exceed a priority 1 threshold with a likelihood of 1 in 100 (1% of the time, probability 0.01), or more, is significant.

2. Any impact expected to exceed a priority 2 threshold with a likelihood of 1 in 20 (5% of the time, probability 0.05), or more, is significant.

3. Any impact expected to exceed a priority 3 threshold with a likelihood of 1 in 5 (20% of the time, probability 0.2), or more, is significant.

4. Any impact approaching or exceeding a priority 4 threshold could be significant. This is a management decision.

5. Any impact that exceeds *only* a priority 5 threshold is not significant.

*B. Impacts Adequately Addressed? (Decision Point 5C).* After identifying significant impacts at Decision Point 5B, the manager must decide how to handle them. The nature of the proposed action may require that unmitigatable significant impacts be tolerated, in which case they are "adequately addressed" and an EIS is drafted (Box 5.2).

On the other hand, particularly in an EA mode, the decisionmaker may wish either to reject the proposal (Decision Point 5D), or have it refined further to eliminate the significant impacts that the analysis identified (Box 2.3).

*5.4 Development of Environmental Documents.* Worksheets and matrics used throughout the process can be thought of as the skeleton of the analysis. Any narrative that accompanies worksheets and matrices should serve to clarify, summarize, or expand upon parts of the analysis that are not self-explanatory. When worksheets are included as appendices or illustrations, refer to them without going into detailed explanation. Guidance on preparing and circulating environmental documents is found in Guidebook Section 1792.

*6. Stage 6—Public Comment and BLM Response.* Public comment may be written or oral. Comments must be addressed if they (1) are substantive and relate to inadequacies or inaccuracies in the analysis or methologies used, (2) recommend reasonable new alternatives, (3) involve disagreements on interpretations of significance, and/or (4) express opinions on the proposal or on personal preference values.

When analyzing comments, organize them by type. Then group them further in terms of project activities (and their change agents) and affected environmental components and processes.

*6.1 Response to Public Adequate? (Decision Point 6A).* Public comments on an environmental document play a major role in determining how adequate that document is. Modify, supplement, or improve analysis by repeating earlier stages to the extent needed.

*A. Inadequacies, Inaccuracies, and Alternative Methodologies.* Factual corrections must be made and recylced through analysis. When a difference of opinion over a significant impact cannot be adequately resolved, that difference must be brought out in all environmental documents and decision documents. Such impacts may require monitoring in order to be resolved.

If additional information is needed to fulfill environmental review and/or consultation requirements of cooperating agencies, those agencies should be encouraged to provide the information and analysis needed for their decisionmaking process. Where additional information is needed for BLM to make a decision, and BLM is a cooperating agency, BLM should provide the information unless other arrangements have been made.

If public comments on a final EIS identify new significant impacts, repeat Stage 2 to determinate whether the impacts are adequately addressed in other environmental documents. Decision documents and records of decision must reflect this information.

If the information has not been covered adequately, the responsible official recommends preparing a supplemental EIS. After this recommendation is approved, the responsible official files an NOI in the Federal Register and proceeds with scoping, focusing on the new issues (Stage 3).

If comments disagree with the methodology used to determine impacts and they suggest an alternative methodology, the team reviews the literature to compare methodologies. This is especially important if suggestions come from agencies with special jursidiction, expertise, and/or recognized experts.

*B. New Alternatives.* If comments recommend new alternatives which were not eliminated in the scoping process, determine whether the alternatives should be analyzed in depth. When new alternatives meet objectives of the proposal, in whole or part, they are cycled through the process to determine whether they are reasonable. If they are reasonable and would result in environmental impact different from those already analyzed, they must be analyzed in depth.

*C. Disagreements on Interpretations of Significance.* When comments disagree with BLM's interpretations of what is significant, the interpretations must be re-evaluated in the light of those comments. Differences of opinion about significance are as important to re-analyze as differences of opinion about the impact itself. Re-evaluations may

require reconsideration of thresholds for significance. These may be legitimate differences of professional opinion. Use a systematic process to attempt a resolution, e.g., the CEQ referral process (40 CFR 1504 and Guidebook Section 1793).

*D. Opinion on the Proposal and Preference Values.* Comments that fall into the category of preference values or "votes" on the proposal need not be recycled through the analysis process. However, they should be summarized whenever possible and brought to the attention of the decisionmaker.

*7. Stage 7—Reaching and Recording Decision.* The decisionmaker must document the rationale for a decision and how environmental analysis was used in making that decision. To the extent possible, the record of decision should be integrated with existing decisionmaking processes and documents. For further explanation, refer to 40 CFR 1505.

*A. Approve Proposal? (Decision Point 7A).* All alternatives considered by the decisionmaker must be included in the record of decision. A decision can approve (1) any single alternative, (2) any parts of alternatives, or (3) any combination of alternatives. Any decision that would result in environmental impacts different from those already analyzed must be re-analyzed in depth, as explained in Section 6.1B above.

*7.1 Record Approval (Box 7.1).* All decisions to approve proposals must be accompanied by a record of decision.

*7.2 Record Disapproval (Box 7.2).* Disapproval results in the no-action alternative. It requires a record of decision also.

*8. Stage 8—Implementing the Decision.* Plans for implementing an alternative and monitoring it are often modified during environmental analysis.

*8.1 Proceed with Implementation and Initial-Phase Monitoring (Box 8.1).* As initial phases of an action are implemented, activities may or may not be monitored. Purposes of monitoring are (1) to help resolve differences of opinion about impacts; (2) to assure decisions are being implemented; (3) to determine whether mitigating measures are working as prescribed; (4) to determine whether impact predictions are accurate; and (5) to discover unanticipated and/or unpredictable effects. A side benefit of monitoring is the gathering of data and information that could be used as a baseline for future analyses.

*A. Mitigation Adequate? (Decision Point 8A).* To determine whether mitigation is adequate, consider several factors: (1) Was the decision, including mitigating measures, implemented as described in the analysis? (2) Are mitigating measures working as prescribed? (3) Are any impacts significant? (4) If so, can they be mitigated? (5) Could some mitigating measures be eliminated because they do not reduce or eliminate significant impacts?

If monitoring indicates the decision is not being implemented as described, every effort must be made to bring about compliance. If mitigating measures suggested by another agency and incorporated into the decision have not been carried out, BLM must inform that agency and work with them to take appropriate action.

If monitoring indicates that mitigating measures are not working as prescribed, BLM reviews those measures to determine whether additional or different measures are needed. Some general criteria for whether mitigation is adequate are:

(1) If mitigation is not working as prescribed but no significant impacts are detected, mitigation is adequate.

(2) If mitigation is not working as prescribed and unexpected significant impacts are detected, mitigation is inadequate.

(3) If mitigation is working as prescribed and impacts occur as predicted, mitigation is adequate.

(4) If mitigation is working as prescribed and unexpected significant impacts occur, mitigation is inadequate.

*8.2 Modify Project—Box 8.2.* If mitigation is inadequate (Decision Point 8A), modification of the action must be considered. The ability to modify an action at this point will depend on whether the proposal was initiated within or outside of BLM. If the project was initiated outside, a great deal will depend on legal constraints of the lease, license, contract, or agreement.

For example, if monitoring reveals violations of law (e.g., air quality standards), BLM should inform the responsible agency so that they can take appropriate action. If BLM can require additional mitigating measures that would reduce or eliminate the unexpected significant impacts, the Bureau should do so.

In the case of a phased decision, later phases may be modified if unexpected significant impacts are found.

When actions are initiated by BLM, violations of any legal thresholds (e.g., air quality standards) or thresholds for planning will require modifying the action to eliminate the violation. If any normative thresholds or goals are violated, the decisionmaker must determine whether modification is necessary.

*8.3 Continue Review and Monitoring (Box 8.3).* After initial phases of an action have been completed, the long-term monitoring program is started, if applicable. It is intended to insure that long-term mitigation and rehabilitation measures are working. Information gained in this review may also be used to modify the action, as described above for initial-phase monitoring.

*8.4 Store Impact Information (Box 8.4).* Information from monitoring is stored in the environmental information system (Box 4.3), if data quality is high enough.

**Chapter 3—Documentation**

1. *Environmental Documents.* There are four "environmental documents" according to the CEQ's NEPA regulations. They are: environmental assessments (EA's), findings of no significant impact (FONSI's), environmental impact statements (EIS's), and notices of intent to prepare an environmental impact statement (NOI's).

1.1 *Environmental Assessment (EA).* An EA must contain sufficient information and analysis to support a decision on whether significant impacts are expected and therefore whether to prepare an EIS.

1.2 *Finding of No Significant Impact (FONSI).* A FONSI is prepared as a separate covering document based on review of an EA. The FONSI may be included in the record of decision.

1.3 *Environmental Impact Statement (EIS).* EIS's are prepared for those actions having a significant effect on the environment.

1.4 *Notice of Intent (NOI).* A notice of intent is prepared to (1) notify persons or agencies interested in, or affected by, a proposal requiring an EIS and (2) seek information and/or participation in the scoping process.

2. *Records of Decision.* Records of decision are prepared for:

2.1 *Categorical Exclusions.* The record of decision must clearly indicate the action is a categorical exclusion, and must reference the list(s) of categorical exclusions applicable. It must also state that the action does not fall under any of the exceptions to the categorical exclusions and must support that conclusion.

2.2 *Decisions Not Requiring Further Environmental Analysis.* Where the proposal is adequately covered by previous environmental documents, the record of decision must indicate the rationale for approval or disapproval of the proposal and must reference the appropriate environmental documents. These may include environmental documents prepared by other agencies.

2.3 *EA's.* Records of decision in cases requiring an EA and resulting in a FONSI must demonstrate clearly that significant impacts are not expected. This can be accomplished by (1) referencing other environmental documents substantiating that the proposal is not expected to result in significant impacts, and/or (2) explaining why impacts resulting from the proposal are not expected to be significant. The record of decision may include the FONSI.

2.4 *EIS.* The record of decision in cases requiring an EIS is described in the CEQ's NEPA regulations (40 CFR 1505.2).

2.5 *Preemptive Rejection.* This takes place when a manager uses his judgement in rejecting a proposal without going through the environmental analysis process. The record of decision in this case must clearly state the rationale for the decision.

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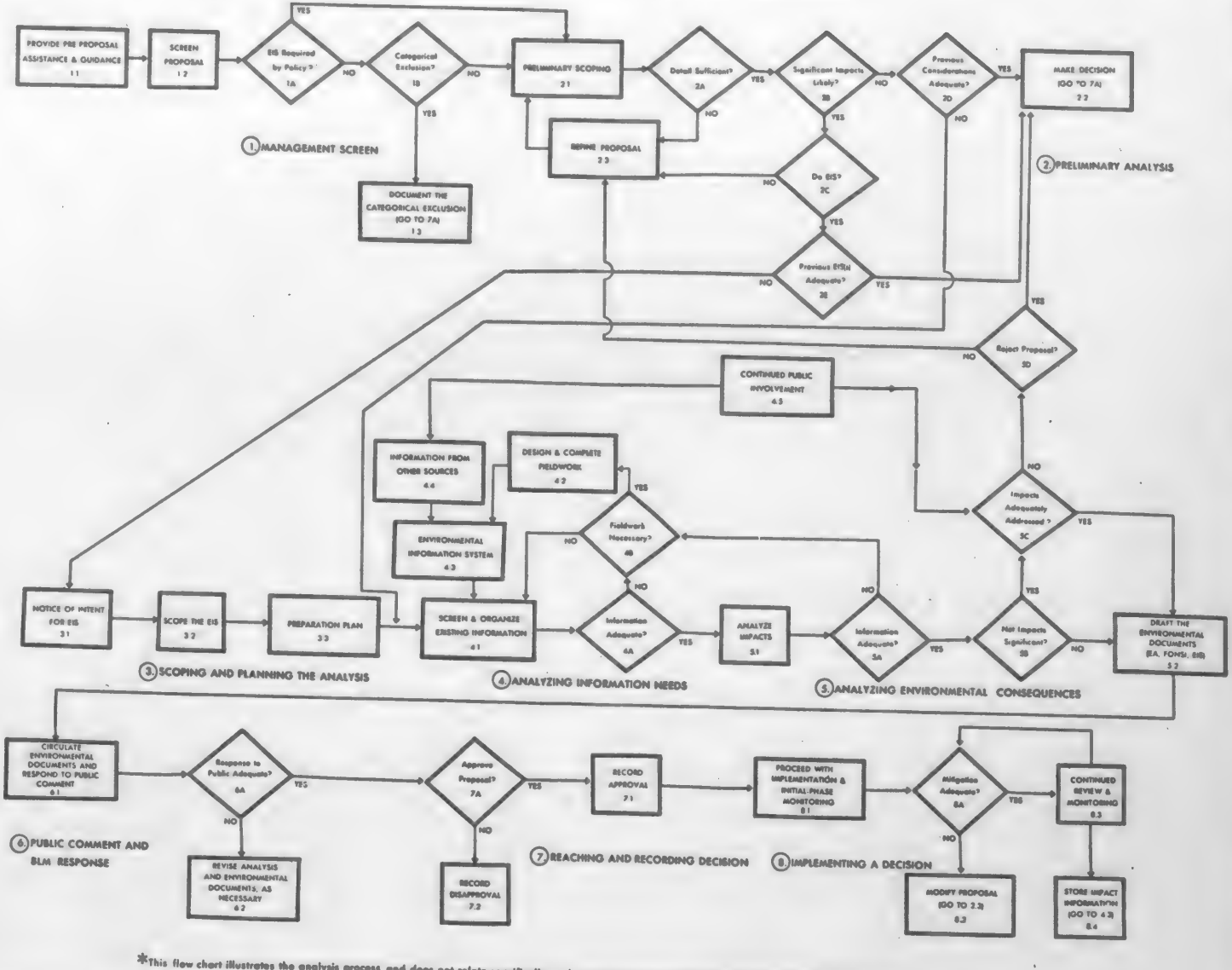
ILLUSTRATION 1

ENVIRONMENTAL ANALYSIS AND DECISIONMAKING PROCESS


PROVIDE PRE PROPOSAL ASSISTANCE & GUIDANCE 1.1
SCREEN PROPOSAL 1.2
EIS Required by Policy? 1A
Categorical Exclusion? 1B
DOCUMENT THE CATEGORICAL EXCLUSION (GO TO 7A) 1.3
1. MANAGEMENT SCREEN
PRELIMINARY SCOPING 2.1
Detail Sufficient? 2A
Significant Impacts Likely? 2B
Previous Considerations Adequate? 2D
MAKE DECISION (GO TO 7A) 2.2
REFINE PROPOSAL 2.3
Do EIS? 2C
Previous EIS(s) Adequate? 2E
2. PRELIMINARY ANALYSIS
Reject Proposal? 5D
CONTINUED PUBLIC INVOLVEMENT 4.5
INFORMATION FROM OTHER SOURCES 4.4
DESIGN & COMPLETE FIELDWORK 4.2
ENVIRONMENTAL INFORMATION SYSTEM 4.3
Fieldwork Necessary? 4B
Impacts Adequately Addressed? 5C
NOTICE OF INTENT FOR EIS 3.1
SCOPE THE EIS 3.2
PREPARATION PLAN 3.3
SCREEN & ORGANIZE EXISTING INFORMATION 4.1
Information Adequate? 4A
ANALYZE IMPACTS 5.1
Information Adequate? 5A
Net Impacts Significant? 5B
DRAFT THE ENVIRONMENTAL DOCUMENTS (EA, FONSI, EIS) 5.2
3. SCOPING AND PLANNING THE ANALYSIS
4. ANALYZING INFORMATION NEEDS
5. ANALYZING ENVIRONMENTAL CONSEQUENCES
CIRCULATE ENVIRONMENTAL DOCUMENTS AND RESPOND TO PUBLIC COMMENT 6.1
Response to Public Adequate? 6A
REVISE ANALYSIS AND ENVIRONMENTAL DOCUMENTS, AS NECESSARY 6.2
6. PUBLIC COMMENT AND BLM RESPONSE
Approve Proposal? 7A
RECORD DISAPPROVAL 7.2
RECORD APPROVAL 7.1
7. REACHING AND RECORDING DECISION
PROCEED WITH IMPLEMENTATION & INITIAL-PHASE MONITORING 8.1
Mitigation Adequate? 8A
MODIFY PROPOSAL (GO TO 2.3) 8.3
CONTINUED REVIEW & MONITORING 8.3
STORE IMPACT INFORMATION (GO TO 4.3) 8.4
8. IMPLEMENTING A DECISION
YES
NO

*This flow chart illustrates the analysis process and does not relate specifically to documentation. For example, final EISs and final EAs are prepared in box 6.2.

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**Illustration 2**

*Preliminary Preparation Plan*

The preliminary preparation plan should be concise and succinct, but must include the following topics in this order.

A. *Purpose of Action.* Define the purpose and need to which the Bureau is responding in proposing the alternatives including the proposed action (40 CFR 1502.13).

B. *EIS Level (coverage of broad or narrow matters).* Identify the level of the EIS. This refers to tiering of EIS's (40 CFR 1500.4(i), 1502.20 and 1508.28) and to the extent of aggregation of proposals (40 CFR 1502.4(c)).

C. *Scoping Process.* Describe the planned scoping process including names of individuals, groups and agencies to be contacted and when and where any planned scoping meetings will be held.

D. *Scope of the EIS.* 1. Describe the proposal and alternatives. List the components and stages of implementation and the related actions to be described and analyzed. Briefly identify related actions and their impacts which will not be covered and explain why.

2. Identify the areal extent of the description of the environment and enclose a location map.

3. Briefly describe significant issues identified by Bureau analysts.

4. Identify problem areas such as areas of incomplete or inadequate information and suggest possible solutions.

5. Identify information to be incorporated by reference (40 CFR 1502.21 and 1506.3.).

E. *Organizational Level.* Identify the office level at which the EIS will be prepared.

**Illustration 3**

*Environmental Impact Statement Preparation Plan*

The purpose of the EIS preparation plan is to summarize the results of the scoping process and to document the planned scope of the EIS. The plan should be concise and succinct, but must include the following topics in this order.

A. *Purpose of Action.* Define the purpose and need to which the Bureau is responding in proposing the alternatives including the proposed action (40 CFR 1502.13).

B. *EIS Level (Coverage of broad or narrow matters).* Identify the level of the EIS. This refers to tiering of EIS's (40 CFR 1500.4(i), 1502.20 and 1508.28) and the extent of aggregation of proposals (40 CFR 1502.4(c)).

C. *Scoping Process.* Identify the groups organizations, agencies, etc. that participated in the scoping process to date. Briefly describe major aspects of the scoping process. Identify allocations of assignments for EIS preparation among lead and cooperating agencies (if applicable).

D. *Scope of the EIS.* 1. Describe the proposal and alternatives. List the components and stages of implementation and related actions to be described and analyzed. Briefly describe alternatives dropped from detailed study during the scoping process. Briefly explain (with reference to the scoping process) why the impacts from related actions will be or will not be treated in the EIS.

2. Identify agencies with jurisdiction or expertise which need to be consulted further in preparing the EIS.

3. Identify the areal extent of the description of the environment and enclose a location map.

4. Briefly describe significant issues and values identified in the scoping process.

5. Briefly describe issues determined (in the scoping process) not to be significant and therefore not requiring detailed study.

6. Identify problem areas such as, areas of incomplete or inadequate information and organizational deficiencies in skills needed to analyze skills identified as significant in the scoping process (40 CFR 1502.6). Suggest possible solutions (such as contracting for needed studies and analysis, scheduling training, and identifying the incomplete or unavailable information which may be handled in accord with 40 CFR 1502.22).

E. *Organizational Level.* Identify the office level at which the EIS will be prepared. Describe the organizational arrangement of the EIS team and its internal work flow and responsibilities. Identify each individual assigned to the EIS team by organization and professional expertise. "The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process . . . ." (40 CFR 1502.6)

F. *Statement Outline.* Show the format in which the EIS will be prepared. Indicate issues requiring detailed study and issues not requiring detailed study and the individuals responsible for them. Outline in sufficient detail to demonstrate that significant issues will be addressed in detail.

G. *Public Involvement Arrangements.* Identify groups, organizations, agencies, etc. that should be involved in subsequent steps in the environmental analysis process and steps to be taken to involve them.

H. *Preparation Schedule.* Identify critical points in the preparation process showing dates. The schedule may be readjusted during EIS preparation to meet unexpected problems or to analyze previously unidentified significant issues.

**Appendix A.—Determining Significance**

*1. Introduction.* This appendix develops a working definition of "significance." To determine whether an environmental impact is significant, we must answer the following question: "Who says it's significant, and why?" In other words, we must consider different viewpoints. Who will be affected by the impact? Why is the impact significant? Or, why not?

We must also clearly distinguish between the environmental impact itself and the significance of that impact to someone, some thing, or the ecosystem itself. This approach lets us identify potential controversy and major impacts early so we can focus analysis on issues that are truly significant.

Worksheet 1 (Illustration A–1) provides a format for identifying potentially significant issues for analysis. A second worksheet (Worksheet 2) designed to identify environmental impacts is explained in Appendix B.

*2. Definitions for Determining Significance.* Determining significance requires setting ground rules that are understood and easily applied. This means defining and using some words precisely, so that everyone knows what's being said.

An *issue* is: an unresolved question about an environmental impact, or about the use of an environmental resource.

An *impact* means: a change in the ecosystem caused by an act of man.

The impact becomes *significant* for some affected interest when it meets both of the following criteria:

(1) The amount of change (increment) exceeds a threshold: *and*

(2) Exceeding that threshold takes on new importance for that affected interest (i.e., according to a particular viewpoint or value system, it is not acceptable to cross that threshold).

A significance *threshold* is a maximum or minimum number, or other parameter, established by somebody or something that will be affected by the impact. It may be an individual or interest group, or it may be a tolerance within the ecosystem itself. The threshold is set according to a particular point of view (value system).

When an environmental impact exceeds a threshold, that impact

becomes "significant" to the affected interest. An *affected interest* is an individual person or species, a human or other population, or any other part or process of the ecosystem affected by the impact.

Different affected interests hold different values that influence their respective viewpoints. A *value system* is a set of values held by any affected interest. Usually the values we hold strongly shape our opinions, attitudes, and behavior, and thus our judgment about what is significant.

Three types of values are used in determining significance:

*Functional values* focus on functioning of an ecosystem at different levels of ecological (biophysical, social/economic, and political) organization. If an impact changes the functioning of one or more of these levels past a threshold value, the impact is significant to that level of the ecosystem affected.

*Normative values* are social norms that serve to guide, regulate, or control "proper and acceptable" social behavior. Often normative values are codified as standards in legislation or governmental regulations. Sometimes they are informal, such as rules of etiquette, tradition, or custom supported by a large portion of the population.

*Preference values* are preferences held by individuals, groups, or organizations, as distinct from society at large. Often preference values become normative values as they spread throughout a society.

*3. Priorities and Likelihood Estimates for Establishing Significance.* Thresholds provide a quantitative means for identifying impact intensities that would be considered significant by some affected interest, *if the impacts occurred at those intensities.* Priorities provide criteria for assigning relative importance to those thresholds. Likelihood estimates supply the probability that an environmental impact will exceed a certain threshold.

Priorities, thresholds, and likelihoods of occurrence all are considered in determining what impacts might be significant. The procedure is explained below (Section 4).

*3.1 Priorities.* The system described below is used to prioritize impact thresholds identified as significant to different affected interests. Priorities may be established by law, regulation, or other factors beyond the decisionmaker's control, by prior commitements, by professional expertise, or by a decisionmaker using his best judgment. If a question exists about which priority to assign, document (in a footnote) the rationale for choosing a particular priority.

The priorities are:

1. *Highest priority.* Threshold established by law or regulation. Not likely to change. Absolute. Threshold may not be exceeded under any circumstances.

2. *Very high priority.* Minimum or maximum constraint thresholds consistent with sound planning and resource use. Usually determined by, or concerned with, functional values of the ecosystem (with man as component). Thresholds rarely subject to change, and only in the light of new information. Should rarely be exceeded. Includes uncertainties and risks which, if misjudged, could result in major or massive irreversible and irretrievable effects on the ecosystem.

3. *High priority.* Thresholds usually established by normative values that are not formally codified in legal requirements, but which clearly carry the force of public opinion sufficient to delay or halt the action if ignored. Also includes thresholds that deal with uncertainties and moderate risks to the functioning of the ecosystem within different contexts.

4. *Moderate priority.* Thresholds that are highly visible or controversial preference values. These might be, or could become, normative values (borderline norms). These thresholds reflect major concerns by an often small, but influential, affected interest. This priority also includes functional thresholds with low risks to the ecosystem.

5. *Low priority.* Thresholds that are preference values of individuals and groups.

*3.2 Qualitative Likelihood Estimates.* Likelihood estimates can be qualitative or quantitative. Qualitative likelihood estimates are used during Stage 2 (Preliminary Analysis) to assist the decisionmaker in deciding whether an EA should be done or whether an EIS may be required. Quantitative estimates are explained in Appendix B.

Qualitative estimates fall into three categories. Where doubt or question exists, use footnotes to document the rationale for choosing a particular qualitative estimate:

| Qualitative estimate | Probability definition |
|---|---|
| Category: | |
| A. High likelihood. | Greater than 50–50 chance of occurrence (Probability greater than 0.5). |
| B. Low likelihood. | Less than (or equal to) 50–50, but at least a 1-in-20 chance of occurrence (Probability 0.05–05). |
| C. Negligible..... | Less than 1-in-20 chance of occurrence (Probability less than 0.05). |

*4. Determining Significance Throughout the Analysis.* Actions "significantly affecting the quality of the human environment" require an EIS [NEPA 102(2)(C)]. Except when a proposed action is categorically excluded, or when an EIS is required by policy, court order, or other similar mandate, the fundamental criterion for whether an EIS will be done is whether one or more impacts will be "significant."

A "catch 22" that exists under NEPA is that often it is not known beforehand whether impacts will be "significant." Technically, an EIS must be prepared in order to determine whether an EIS is required! This analysis and decisionmaking process deals with the problem by using the interaction of three factors to avoid unnecessary paperwork and delay (i.e., an unnecessary EIS), while assuring that all environmental analysis *required* for reaching better decisions is performed.

The three factors that determine significance of an impact are: (1) threshold quantities set for that impact by one or more affected interests; (2) priorities of those thresholds; and (3) likelihoods of the impact exceeding one or more thresholds.

These factors are introduced and considered during analysis at different times and in different ways, as described below. Worksheets 1 and 2, in conjunction with supporting analyses from relevant environmental disciplines, provide a record of what was considered and how significance was decided upon.

*4.1 Analyzing Significance in Different Stages.* Usually most issues will be identified during Stage 2 (Preliminary Analysis) and Stage 3 (Scoping and Planning the Analysis). Whenever issues are raised that are significant to some affected interest, use Worksheet 1 to record each issue separately. Work with those parties raising the issues to fill in as much of the worksheet as possible. Identify thresholds, and priorities, and likelihoods connected with the thresholds, wherever possible.

Unless there is good reason to quantify probabilities at this time, use qualitative categories (A, B, or C). To generate preliminary likelihood estimates, ask: How likely is this threshold to be exceeded by impacts resulting from any alternative in this proposal? In Stage 2, use Illustration A–2 (Identifying Significant Issues for Analysis) to assist in deciding which way to proceed at Decision Point 2B. Consider each threshold identified on Worksheet 1.

In Stage 3, use Illustration A–2 to focus further analysis on "significant issues to be analyzed in depth in the environmental impact statement" and to "identify and eliminate from detailed study the issues which are not significant" [40 CFR 1501.7(a)(2) and (3)].

In Stage 4, when preparing an EIS, use significant issues identified on Worksheet 1 to focus literature review and screen existing information. Concentrating on significant issues will reveal what information is applicable to the analysis and what additional information is needed to continue analysis.

Stage 5 uses Worksheets 1 and 2 to analyze significant issues and potential impacts associated with them, as well as to discover any other impacts that could be significant. In Stage 6, if public comment raises any issues not already addressed in an environmental document, handle those issues in the same way as in Stages 2 and 3, using Worksheets 1 and 2.

Worksheets 1 and 2 also assist the decisionmaker in reaching decisions (Stage 7) about implementing a proposed action, mitigating potential impacts, and monitoring, when necessary (Stage 8).

*5. Worksheet 1: Explanation.*

Worksheet 1 is used to define the level of significance of a particular issue. On this worksheet, the following information is identified:

—Who is concerned.

—Specific aspects of the issue most critical to agencies, groups, or individuals (common denominators for discussion or measurement).

—The setting (context) in which the concern is to be discussed or measured. This may be a setting of time or geographic area, or it may be a social or cultural context.

—A baseline quantity (Column 6) from which to establish thresholds of concern (Column 8).

—Units of measurement.

—Threshold levels which, if exceeded, would be viewed as unacceptable by the individual or group concerned with that specific aspect of the issue.

—The priority of the concern. (This is the weight, or the degree of social expression, to be applied to the concern.)

Note that normally a high issue priority would most likely lead to a high impact priority. However, there may be high-priority issues or public concerns for which there may be little or no related impact. Issues are linked to impacts through priorities, thresholds, and likelihoods of impact occurrences.

5.1 *Issue.* Often when an issue is first raised, it is expressed only as a vague concern about changing a component or process of the ecosystem. Baseline information frequently is lacking, and the affected person or interest may be unable to quantify that concern.

Line 1 on Worksheet 1 provides space for writing that concern in the form of an unresolved question. Once you have written down what is affecting an interest, you have a starting point for analyzing the problem.

5.2 *Date.* For each line, write the date on which that line was begun. Rarely will you be able to complete a line immediately, but writing the date establishes the time that the issue was first raised. In some cases, certain entries on a line, such as a threshold value, priority, or likelihood estimate will change in the light of new information. If that happens, rewrite the entire line with a new date and new values. This provides a chronological record of how significant issues changed during analysis.

5.3 *Affected Interest.* The affected interest might be an individual, an interest group, a population, a government agency, or some other affected portion of the ecosystem. Usually an affected interest is the human being(s) raising an issue or concern.

5.5 *Indicator Component/Process.* An indicator tells us the condition of whatever we are concerned about. It can be a component or process of an ecosystem, or an index of some sort. Include the attribute used to describe the indicator.

A *component* is any structural feature of the ecosystem. It can be a species, a life form, a population, a socioeconomic class, a trophic level, a soil series, or any other element that is part of the ecosystem structure.

A *process* describes the way components function and interact. Ecosystem processes include birth, feeding, fire, migration, consumption, transporting, erosion, evaporation, etc.

An *index* often is a ratio that compares the condition of a component or process against some standard value or against some other component or process. The consumer price index is an example of the first type. Precipitation : evaporation ratios are an example of the second.

Another kind of index is related to thresholds. Air or water quality standards are examples of threshold values that serve as indices to the quality of our environment. These are usually expressed in specific units of measure, whereas ratio indices often have no units other than percentage.

Each component or process is characterized by certain *attributes.* Attributes describe different features, qualities, or characteristics of a component or process. Examples of attributes are weight, length, speed, color, etc.

Usually threshold values are given in terms of some attribute that is particularly characteristic of an ecosystem component or process. An example is vegetation (a component) as described by color, biomass, height, growth form, season of growth, etc., all of which are attributes.

Attributes of components are usually described by absolute units, such as kilograms, meters, liters, or units relative to space, such as kg/ha, numbers/acre, etc. The attribute most commonly used to characterize a process is some kind of rate (a quantity per unit time), such as visitors/year, kg/day, cubic ft/sec, tons/year. Growth rates are sometimes expressed as a percentage of the population or some part of it (e.g., births/thousand females).

5.5 *Context.* The context of any impact—the relationship of that impact to space, time, and other factors—plays a major role in determining the significance of that impact. Consider different contexts when evaluating intensity of an impact on different affected interests.

Spatial, or geographic, contexts include different areas, ranging from a specific site to the nation, and possibly beyond. Temporal contexts are the timing (e.g., season of year) and duration of an action, including long- and short-term considerations.

Also consider the following other factors when evaluating context for significance: uniqueness, controversy, legal violations, benefits and detriments, uncertainty and risk, setting precedent, cumulative effects, and public health and safety. These are explanined in 40 CFR 1508.27.

Finally, worksheets are used to help develop the environmentally preferable alternative. This alternative is used to help identify significant impacts resulting from other alternatives.

5.6 *Baseline Quantity.* An impact is a change in the ecosystem caused by an act of man. We must know what conditions exist now (including trends) and what conditions could exist sometime in the future without *further* intervention by man. Changes from these conditions are measures of impacts from the proposed action and its alternatives (except the no-action alternative). For each indicator, this status quo is described by a baseline quantity that includes trend estimates, where appropriate.

Baseline quantities for different indicators help describe the

environmental setting, or the existing conditions of the ecosystem, within which a proposed action will occur. These conditions are important to know as a basis for estimating impacts of the proposed action, alternatives to achieve the same purpose as the proposed action, and the no-action alternative.

Baseline descriptions should include information about (1) what is there and (2) where it appears to be going (trends).

5.7 *Units.* Components, processes, and indices are usually measured or described in some units. Specify one set of units for both baseline and threshold values.

5.8 *Threshold Quantity.* When a significant issue is first raised, try to determine the best indicator and the threshold for that indicator. Where different affected interests are concerned about the same issue, try to get everyone thinking in terms of the same units. This will simplify the problem of establishing thresholds.

For example, if sportsmen and wildlife managers are concerned about a deer herd that could be affected by a proposal, try to establish a single indicator to focus the issue on. It might be buck:doe ratios, mean weight per animal harvested, birth rate per 1000 does, etc. Then get each group to specify the thresholds they want, giving their reasons. Recording the reasons for any threshold helps the manager set priorities for any threshold value. Use footnotes, where necessary.

5.9 *Priority/Likelihood Category.* Priorities and criteria for assigning them are explained above (Sections 3 and 4). Include qualitative likelihood estimates in this column (Categories A, B, and C).

5.10 *Footnotes.* Use this space to clarify any entry on Worksheet 1 that needs further explanation. Document rationale for assigning priorities and likelihood categories wherever any doubt or question exists.

**Illustration A–1.—Worksheet 1 Identifying Significant Issues**

Use this worksheet in most stages of the environmental analysis and decisionmaking process to identify significant environmental issues, establish environmental impact thresholds, and set priorities on them. Further explanation is found in Appendix A, Guidebook Section 1791.

*Instructions*

In the upper right corner, place the EA or EIS number and title. Number each issue as it is raised.

1. *Issue.* Write the concern or issue as an unresolved question.

2. *Date.* Write the date on which this line is first established, even though some information might be missing from the line.

3. *Affected Interest.* Specify the interest that will be affected by exceeding the impact threshold.

4. *Indicator Component/Process.* Specify the component or process and attribute to be used as indicator or an impact.

5. *Context.* Describe spatial, temporal, and/or other context(s) of the impact, i.e., geographic area, duration, timing, uniqueness, etc. Check CEQ regulations (40 CFR 1508.27) for others Use footnotes to explain further, if necessary.

6. *Baseline Quantity.* Write a quantitative value for the existing condition (including trends) of the indicator component or process as it is currently know (i.e., the status quo). The value may be an estimate, or it may be based on research, inventory or other data. Where necessary, use footnotes to explain, particularly if quantitative values are not known.

7. *Units.* Specify the units, or dimensions, in which the indicator is described or measured. Use the same units for both baseline and threshold values.

8. *Threshold Quantity.* Write the quantity of the threshold value.

9. *Priority/Likelihood Estimate.* Assign a priority (1 through 5) to the threshold on this line and include a preliminary likelihood estimate (Category A, B, or C) of exceeding this threshold.

10. *Footnotes.* Use space on reverse side of worksheet to clarify any entry. Number all footnotes.

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Worksheet 1: IDENTIFYING SIGNIFICANT ISSUES

1. Issue _____ EA/EIS No. _____

_____ Title _____

_____ Issue No. _____

| 2. Date | 3. Affected Interest | 4. Indicator Component/Process | 5. Context | 6. Baseline Quantity | 7. Units | 8. Threshold Quantity | 9. Priority/ Likelihood |
|---|---|---|---|---|---|---|---|
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Use a numbered footnote to identify any item or entry that requires further remarks. Write remarks on reverse side of page.

Worksheet 1: IDENTIFYING SIGNIFICANT ISSUES

1. Issue Disturbance of pronghorn critical winter range

EA/EIS No. _____

Title _____

Issue No. _____

| 2. Date | 3. Affected Interest | 4. Indicator Component/Process | 5. Context | 6. Baseline Quantity | 7. Units | 8. Threshold Quantity | 9. Priority Likelihood |
|---|---|---|---|---|---|---|---|
| | State Fish and Game | Sagebrush/winter fat | critical winter range 70,000 acres | 70,000 | acres | 14,000 acres | 5 |
| | BLM wildlife biologists | " | Timing | " | " | | 4 |
| | | | | | | | |
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Use a numbered footnote to identify any item or entry that requires further remarks. Write remarks on reverse side of page.

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**Illustration A–2.**—*Identifying Significant Issues for Analysis*

| Priority | Likelihood category | | |
|---|---|---|---|
| | A | B | C |
| 1 | Yes | No | No. |
| 2 | Yes | No | Omit. |
| 3 | Yes | No | Omit. |
| 4 | Maybe | No | Omit. |
| 5 | No | No | Omit. |

Use this table to help decide whether an EIS is warranted, whether certain impacts should be mitigated (and how much), and which impacts to analyze in depth.

*Stage 2.* At decision point 2B, use the table to identify significant impacts. If thresholds on Worksheet 1 are identified as 1–A, 2–A, or 3–A priority/likelihood categories, there will probably be significant impacts from the proposal. A threshold rated 4–A is borderline; it may or may not be significant. The manager must decide this, on the advice of his staff.

If significant impacts are likely (Decision Point 2B), the decisionmaker has the option of returning the proposal for refinement to eliminate potentially significant impacts or reduce their likelihood through mitigation (Decision Point 2C). If this is done, the proposal recycles within Stage 2, and the analysis could then go into an EA mode (Decision Point 2E).

*Stage 3.* If the analysis goes into formal scoping, the priority/likelihood categories help the EIS team to develop the notice of intent (NOI). Issues rated 1–A, 2–A, 3–A, and possibly 4–A are listed in the NOI to alert the public to issues considered potentially significant by the BLM. Other issues may be listed also with their priority/likelihood categories to identify other concerns that are being considered for further analysis by the BLM.

*Stages 4 and 5.* Where gathering further information (Stage 4) to complete the analysis (Stage 5), concentrate the information search and analysis on significant issues. However, also analyze the lower categories (5–A through 1–C) in enough detail to make quantitative estimates on Worksheet 2 of their probabilities of occurrence. Issues falling into categories 2–C through 5–C do not need to be analyzed further, *unless* they change categories later.

**Illustration A–3.**—Focus of BLM Environmental Analyses on Affected Interest Values

In our pluralistic society, it is obvious that representative government must take account of issues and values which are important to various system levels (individuals, groups, organizations, etc.). It is not appropriate, however, for any particular environmental analysis to ignore the context [1] for significant determinations.

The CEQ NEPA regulations allow for a *systematic* process of tiering agency plans so that NEPA documents may "concentrate on the issues that are truly significant to the action in question" while allowing all pertinent values to be considered at some tier in the overall NEPA process. In BLM's application of the NEPA process to its activities, tiered planning will be utilized where appropriate as a means of focusing on the most germane values and as a means of reasonably limiting the range of alternatives considered for any particular action in question.

The following serves as a guide for determining the scope [2] of BLM environmental analyses conducted as part of Bureau planning pursuant to FLPMA and OCSLA. It shows for each planning tier a germane set of system levels, comprising the most immediate level of concern and interrelationships between that level and adjacent levels.

**Illustration A–3**

| Level of system [affected interest] | Tier [1] of planning |
|---|---|
| International (ecosphere), National (society), Organization | Policy Development: focused on individual programs or specific program interrelationships. (a) National—guidance by BLM Director or higher levels in the Federal government. (May include development of international policies.) (b) State—guidance by BLM State Directors. |
| National (society), Organization, Group | Land Use: focused on geographic regions.[3] In BLM, land use plans focus on a level of multiple use planning which in the past was represented by Management Framework Plans (MFPs) but now includes transition period MFPs, MFP amendments, and Resource Management Plans (RMPs).[3] |
| Organization, Group, Individual | Implementation: focused on functional (activity) plans for specific programs [4] and/or on specific project design or action decisions. |

[1] 40 CFR 1508.28(a) (Plans may be tiered geographically or temporally.)
[2] 40 CFR 1502.4(c)(1); 40 CFR 1508.27(a) 40 CFR 1508.28
[3] 43 CFR 1601
[4] Not all programs in BLM utilize activity plans.

## Appendix B.— Analyzing and Summarizing Impacts

*1. Introduction.* Change agents produce impacts, either direct or indirect, and direct impacts often cause indirect impacts over time and space. An impact is a change in the ecosystem caused by an act of man. Estimating the increment of change (increase or decrease) is the first step toward quantifying impacts and one of the most difficult tasks of the environmental analysis process. There is simply no way to predict most impacts with certainty.

However, by applying an organized, systematic approach to impact analysis, the interdisciplinary team can develop credible estimates and leave a clear record of how those estimates were derived. This appendix explains procedures for doing this through the use of a worksheet and two matrices. Worksheet 2 (Illustration B–1) is for identifying impacts. Matrix 1 (Illustration B–2) is used to summarize, for each ecosystem component and process affected, those impacts resulting from a single alternative. Matrix 2 (Illustration B–3) permits comparison of alternatives. Worksheet 3, used in an optional methodology, permits a deeper analysis and prediction of impacts.

*2. Worksheet 2—Explanation.* Worksheet 2 is designed for all levels of impact analysis, from preliminary analysis through analysis for a major EIS. It helps organize information from the proposal or plan and assists in identifying information needs. Instructions for filling out Worksheet 2 are provided in Illustration B–1.

2.1 *Alternative.* Reasonable alternatives must be explored and evaluated in the same way as the proposed action. The term "alternative" is used here to include the proposed action, no action, and any other reasonable alternative to the proposed action. Use this line to identify which alternative is being analyzed. It may be useful to identify alternatives with a letter, number, acronym, or other appropriate code.

2.2 *Implementation Stage.* Use this line for proposals that involve different stages of decision implementation. An example might be a coal mine, with a construction stage, an operational stage, and a rehabilitation stage. This information should be in the proposal or plan.

This line can also be used when analyzing a number of actions in a single, aggregated EA. In that case each action might be considered as an implementation stage for analysis purposes, particularly if it involves several subactions.

2.3 *Action.* An alternative will generate different types of actions, such as: clear-cutting, allocating grazing, controlling predators, drilling, road building, etc. Each action may produce several change agents. Use this line to list the action (or subaction) being analyzed.

2.4 *Major Ecosystem Component/ Process Affected.* Specify the major

[1] 40 CFR 1508.27(a).
[2] 40 CFR 1508.25.

ecosystem component being analyzed, such as soils, air, water, big game, vegetation, etc. This can also refer to a BLM program, such as minerals, range, outdoor recreation, forestry, etc.

2.5 *Change Agent.* A change agent is the cause of an impact. Change agents produced by man's actions cause primary impacts. Primary impacts often become change agents themselves to produce secondary impacts. Similarly, secondary impacts produce tertiary impacts, and so on into higher-order effects.

Use Worksheet 1 to track primary impacts through their higher-order effects. An interdisciplinary team should work together to identify both direct and indirect impacts. Direct impacts are the same as primary impacts. Indirect impacts include all higher-order effects.

One method that has been successful for tracking indirect impacts is described below:

Identify primary change agents with the letter *A* and a subscript. For instance, write "$A_1$ Clearing and grubbing; $A_2$ Cut, fill, and place culvert"; etc. The letter tells you that this is a primary change agent, and the subscript identifies that it is the first, second, etc., primary change agent listed on the worksheet. The rest of the line on Worksheet 1 describes the primary impact.

Use the same system to identify higher-order impacts, tying them to their change agents. For example, change agent $A_2$ will displace soil, which will produce secondary impacts. Write "$B_{21}$ Soil displacement" for the secondary change agent. the letter *B* identifies it as a secondary change agent, the first subscript (2) links it to change agent $A_2$, and the second subscript (1) identifies it as the *first* indirect impact produced by $A_2$.

Soil displacement will reduce soil fertility by mixing horizons. It will also increase erosion and deposit silt in the creek. These are secondary impacts that are also tertiary change agents. Write "$C_{211}$ Reduced soil fertility" and "$C_{212}$ Silt deposition" to identify these new change agents. Again, the letter *C* identifies the agents as tertiary, and the subscript links the agents with earlier impacts that produced them.

A fourth-level change agent would be "$D_{2121}$ Silt deposition." This change agent will affect the fish population. At this point, the wildlife specialist continues the analysis from the fishes' perspective.

The method described above is not essential. It is one way to link direct and indirect impacts. Other ways may be easier and more effective. Experiment!

2.6 *Increase/Decreases.* Use a + or − in this column to indicate whether the change agent increases or decreases the quantity of whatever is being impacted. Remember, *this column does not represent the commonly used terms "beneficial" or "adverse."* It is used to identify whether the change agent will increase or decrease something in the ecosystem.

2.7 *Impacted Component/Process.* A component is a structural feature of the ecosystem. It can be a species, a life form, a population, a socioeconomic class, a trophic level, a soil type, or anything else that describes part of the ecosystem structure.

A process describes the way ecosystem components function and interact. Examples of processes are birth, feeding, migrating, transporting, buying, erosion, evaporation, photosynthesis, etc.

An index sometimes may be used in this column as well. An example of a common index of agricultural soil quality is the carbon:nitrogen ratio.

Each component or process of an ecosystm is characterized by certain attributes, such as weight, length, speed, color, etc. Be certain to include the attribute used to describe the component or process.

2.8 *Estimated Quantity.* In order to be an impact, the quantity of a component or process must change as a result of man's acts. Estimate the increment of change in this column. If a single number is not possible, use a range or estimate a percent change.

2.9 *Units.* List the units used to describe the component, process, or index. Usually components are described by absolute units, such as kilograms, meters, liters, or units relative to space, such as kilograms/hectare, numbers/acre, numbers/mile, etc.

Processes usually are quantified as a rate (quantity per unit time), such as people/year, kilograms/day, acre-feet/year, cubic feet/second, etc. Because many indices are ratios, they often have no units. Percentages can also be used in this column, although use of a percentage change implies that baseline numbers are known.

2.10 *Duration.* Impacts last over some time period, ranging from a few hours or days through the life of any project and beyond. Estimate as quantitatively as possible the length of time that the impact will last. *Make certain not to use "short-term" and "long-term."*

2.11 *Probability.* Many impacts can occur as a result of an action. Not all are equally likely to occur. We are used to hearing daily weather forecasts of the "probability of precipitation." Use this column to estimate a quantitative "probability of impact."

Quantitative probability estimates always fall between zero and 1.0. They can also be expressed as percentages between zero and 100%. A zero probability means that an impact will never occur; a probability of 1.0 (or 100%) means that an impact will occur with certainty. .

Quantitative probability estimates about any impact must always add to 1.0 (or 100%). For example, stating that an impact will occur with a probability of 0.75 (3 out of 4 chances of occurrence) implies that there is also a 0.25 probability that it will *not* occur (1 chance in 4).

Quantitative probabilities are used primarily during impact analysis (Stage 5) to identify the likelihood of any impact occurring. They are extremely important for analyzing impacts associated with significant issues. (See Guidebook 1791, Section 5.3A).

To estimate probabilities, ask "How likely is this impact to occur?" Is it a 50–50 chance? Ninety percent? Five percent? Write the estimate either as a percentage (so many chances out of a hundred) or as a decimal between zero and one.

Estimating probability of an impact is a real test of professional skill and judgment, but the manager must know which impacts are most likely to occur in order to make a sound, informed, intelligent decision.

2.12 *Relative Importance and Context.* Use this column to describe the context of an impact: How important will an impact be, and in relation to what?

Include synergistic effects. Synergistic effects are interactions among two or more impacts that together produce more impact than the simple sum of individual effects. An example is photochemical smog in which a mixture of pollutants is rendered more potent by reaction with sunlight than would be expected from the mixture under other conditions.

State ways in which the impact could be most important. For example, include (1) critical time period (spring, 15–30 April, etc.) and (2) critical area (winter range, breeding grounds, spawning area, etc.).

Ask: Is the impact important to functioning of the ecosystem or to the web of impacts generated by the action? Is it important in relation to impacts from other proposals or ongoing activities? Is the impact on a resource important relative to the total resource available, e.g., the total population of animals? Should the impact be analyzed

in more detail? Is it related to any significant thresholds on Worksheet 1?

2.13 *Footnotes.* Use numbered footnotes to explain any entry or continue any comments from the front of the worksheet. Document rationale for estimates of impacts and probabilities. For example, reference literature or any other worksheets or files used to develop estimates.

*3. Summarizing Impacts.* After the interdisciplinary team has estimated impacts, impacts should be summarized concisely. This is done in impact summary matrices after worksheets are completed.

*3.1 Matrix 1: Impact Summary Matrix.* To develop an impact summary matrix (Illustration B–2), list change agents from all pages of Worksheet 2 across the top of the matrix. List affected ecosystem components and processes down the left-hand side, along with their units.

In each intersection (space or cell of the matrix) where an impact is anticipated, write the quantitative estimate of that impact from column 8, Worksheet 2. A column on the extreme right of each matrix is used for the sum of all impacts caused by each change agent and/or impact on a particular component or process of the ecosystem.

For example, several different actions might increase sediment load. The cumulative impact on sedimentation would be the total of all impacts in the sedimentation row of the matrix. If the matrix is too large, it may be necessary to develop two or more matrices.

If any synergistic effects are expected beyond cumulative effects, explain them in the text of the report.

*4. Comparing Alternatives. In order to choose among several alternatives, the alternatives must be comparable. Impacts of each alternative must therefore be calculated and displayed in such a way that the decisionmaker can decide quickly and objectively what the trade-offs between one alternative and another are. The comparison matrix (Illustration B–3) provides this capability.*

*4.1 Matrix 2: Comparison Matrix.* Right-hand summary columns of impact summary matrices (Illustration B–2) can be used to develop a final comparison matrix for an environmental document. List alternatives across the top of the comparison matrix (Illustration B–3). Down the left side, list all ecosystem components and processes, with units, that will be impacted by any alternative.

Write all impacts resulting from one alternative in a single column of the matrix. These values come from the right-hand columns of impact summary matrices. Use text to describe potential synergistic effects and to explain any other impacts requiring further clarification.

* * * * *

**Optional Methodology**

*5. Expected Impact Calculations.* There is no way to predict most impacts accurately *and* with certainty. Worksheet 2 provides space for a "one-number" estimate of both an impact and the probability of that impact's occurring. This estimate, however, is usually the impact voted by the experts as most likely to occur.

Practically, we know there are several possible impact intensities that can occur to a single ecosystem component or process from a single change agent. These impact intensities fall along a continuum with an upper and lower limit (i.e., a range of possible impact intensities). They also vary in probability of occurrence.

The following approach considers the range and continuum of possible impacts, using simple, traditional methods of risk analysis for business and economies. It allows the user to project impacts more systematically and accurately (1) by including in the estimate the range and some intermediate values, and (2) by recognizing the uncertainties associated with these values.

This method is particularly recommended for analyzing environmental impacts associated with significant issues.

*5.1 Worksheet 3.* Worksheet 3 (Illustration B–4) permits the analyst to look more closely at any impact identified on Worksheet 2 and calculate an *expected impact.* The technique formulates an *expectation* of what an impact will be by identifying several specific, quantitative impacts on an environmental component or process, then associating a probability (likelihood of occurrence) with each increment of change.

An expected impact is a composite value based on several estimates for any specific impact, together with the probability of occurrence for each estimate. It is denoted by the symbol E(I). Specific instructions for calculating E(I) using Worksheet 3 are found in Illustration B–4.

Blanks at the top of Worksheet 3 should contain the same information found in the first two sections of Worksheet 2. This links the two worksheets. Line 4 is used to develop a sentence that summarizes the impact from Worksheet 2. Line 5 identifies the significant issue (if any) associated with this environmental impact.

The rest of Worksheet 3 provides space for calculating (1) an expected impact, E(I); (2) estimates of relative and absolute variability; (3) percentage change from existing conditions; and (4) the probability of an impact's exceeding a high-priority threshold value.

Use Worksheet 3 selectively to analyze impacts associated with significant issues, or impacts that have potential for causing other problems. *It should not be used routinely for each impact identified on Worksheet 2.*

*5.2 Impact Sentences.* An *impact sentence* is a simple declarative sentence. It can be written for any change agent that produces an impact, based on any line across Worksheet 2.

*A. Example Impact Sentence.* Logging 40 Acres in June at NW¼, SE¼, Sec 22, T6N, R30W, 6PM will probably increase sedimentation in Beaver Creek to 60 mg/l during the first year; this is an increase of 100% over the long-term mean for the watershed, compared with normal annual fluctation of 67%: the additional sedimentation is not likely to have effects on other resource values in this stream.

*5.3 Estimating Impact Likelihoods.* An expected impact is essentially a weighted average of impact estimates. Individual experts, or the interdisciplinary team itself, first estimate several values for a particular impact, beginning with a range and a most likely value (a mode).

If so little is known about the impact that only three values can be estimated (a range and mode), then use these values as follows: Write the three values in column 8 of Worksheet 3, beginning at the top with the lowest value and progressing downward through the highest (Illustration B–5). Write the probability of the occurrence on the left side of column 9 under *Indiv. (P).* At the same time under *Cum.,* sum the probabilities cumulatively. They must sum to 1.00.

*A. Example.* The interdisciplinary team has determined that one of the change agents will be logging 40 acres at some location in June. The forest hydrologist wrote the impact sentence presented in Section 2.A, above.

In a meeting of the interdisciplinary team, the leader asked him to provide a range for that estimate. The hydrologist estimated that in a dry year, sedimentation might not get above 30 mg/l, whereas under extremely wet conditions, the sediment load might reach 80 mg/l. The probabilities of occurrence for these three values were about 15% of the time for each end of the range and 70% of the time for the most likely estimate.

The team then calculated the expected impact from those estimates by multiplying each impact by its "weight," or probability, and adding the results:

| Impact (mg/1) | Likelihood of occurrence (probability) |
|---|---|
| 30 | .15 |
| 60 | .70 |
| 80 | .15 |
| | 1.00 |

$E(I)=30(.15)+60(.7)+80(.15)=$
$4.5+42.+12.=58.5$

The more he thought about this value of E(I), the more uncomfortable the hydrologist became with it. He thought it should really be a bit higher, but he also felt the range was about right.

He then took a closer look at the probabilities and came up with the following distribution, based on whether records for the area:

| Impact (mg/1) | Likelihood of occurrence (probability) |
|---|---|
| 30 | .05 |
| 40 | .05 |
| 50 | .1 |
| 60 | .5 |
| 70 | .2 |
| 80 | .1 |
| | 1.00 |

He then calculated a new E(I) by multiplying each impact times its probability and adding the results together:

$E(I)=30(.05)+40(.05)+50(.1)+$
$60(.5)+70(.2)+80(.1)=60.5$ mg/1

This value was closer to the hydrologist's original single estimate of 60 mg/1, and was even slightly higher. It also conformed with the hydrologist's professional understanding of weather patterns and his knowledge of sedimentation history for the area.

Furthermore, his misgivings about the first estimate (58.5) forced him to look further and derive better-informed estimates. In this case, he learned that, although his range was about right (30 to 80), the area had a predominance of wet weather, so the likelihood of the minimum occurring was less than that of the maximum occurring, and the impacts were more likely to be at the higher end of the range. His investigations enabled him to construct the probability distribution and provide estimates that were more defensible and credible.

*5.4 Measures of Variability.* Another advantage of calculating an expected impact is that it permits estimating variability. The concept of expectation is central to basic statistical theory: The mean, or arithmetic average, is defined formally as an expected value.

Where only a range and mode are estimated, the range is suitable for some indication of extreme variability. However, using this method, it is possible to calculate a better measure of variability than the range. This measure is the classical standard deviation of statistics.

Calculating a variance and standard deviation is somewhat more complicated than calculating an expected impact. However, the use of statistics has become so widespread that many pocket and desktop calculators have keys to make these calculations routinely. The example below uses a method of calculation that illustrates what the variance and standard deviation are. Worksheet 3 uses a method of calculation that is more efficient (items 10 through 17, Illustration B–6). Both methods arrive at the same answer.

Determining the variance of an expected impact means knowing how much each estimated impact deviates from the mean, or expected impact. This is calculated by subtracting E(I) from each individual estimate.

To calculate the variance, square each deviation, multiply the squared value by its probability, and sum the results. Estimate the standard deviation by taking the square root of the variance (line 17).

*A. Example.* Using the hydrological problem above, calculate the variance and standard deviation as follows. E(I) is 60.5 mg/1. (The following table is for demonstration only. Worksheet 3 uses a different computational method to arrive at the same answer.)

| Impact (mg/1) | Probability | [Impact-E(I)] | [Impact-E(I)]2 |
|---|---|---|---|
| 30 | 0.05 | −30.5 | 930.25 |
| 40 | 0.05 | −20.5 | 42.25 |
| 50 | 0.1 | −10.5 | 110.25 |
| 60 | 0.5 | −0.5 | 0.25 |
| 70 | 0.2 | 9.5 | 90.25 |
| 80 | 0.1 | 19.5 | 380.25 |

The variance of E(I) is written as Var(I). It can be calculated as follows:

$Var(I)=930.25(.05)+420.25(.05)+110.25$
$(.1)+0.25(.5)+90.25(.2)+380.25(.1)=$
$134.75$

To calculate the standard deviation about the expected impact, extract the square root of Var(I). The standard deviation is written S(I).

$S(I)=134.75=11.608$

The expected impact and an estimate of its variability can be written:

$E(I)\pm S(I)=60.5\pm11.6$ mg/1

*5.5 Comparing Variability.* Estimates of expected impacts and their deviations can be used to compare variability of different types of impacts, even when units are far different. This is done by calculating a coefficient of variation (line 18). The coefficient of variation, CV, is a percentage of deviation. It is simply the ratio of the standard deviation, S(I), to the expected impact, E(I), expressed as percentage.

In the above problem, the coefficient of variation is calculated as follows:

$$CV=\frac{S(I)}{E(I)}\times100=\frac{11.6}{60.5}\times100=19\%$$

*5.6 Percentage Change.* Often the significance of an impact will be determined by the amount of change from existing conditions in the ecosystem. Line 19 provides space for estimating that amount of change in terms of percent. This relative value (percentage of existing conditions) is often more revealing than absolute quantities of change.

*5.7 Exceeding Thresholds.* Worksheet 1 contains threshold values for impacts associated with significant issues. Each threshold is assigned a priority, as explained in Appendix A. Lines 20 through 22 provide space for determining the probability of exceeding a high-priority threshold.

On line 20, insert the most important threshold for this issue as identified on Worksheet 1. Write the priority of that threshold on line 21. Calculate the probability of exceeding that threshold and insert the answer on line 22.

This is calculated from columns 8 and 9, as follows:

*A. Upper Thresholds.* If the threshold is near the upper end of the range, use the following method.

A.1. Locate the two quantities in column 8 that bracket the threshold value (i.e., the two numbers on either side of the threshold).

A.2. For the *smaller* of these two numbers, find the *cumulative* probability on the right side of column 9. If the threshold value appears in column 8 exactly, use its cumulative probability, rather than the smaller value.

A.3. Subtract the cumulative probability from 1.00 and write the answer on line 22.

*B. Lower Thresholds.* If the threshold is at the low end of the range, use the following method.

B.1. Locate the two quantities in column 8 that bracket the threshold value (i.e., the two numbers on either side of the threshold).

B.2. For the *larger* of these two numbers, find the *cumulative* probability on the right side of column 9.

If the threshold value appears exactly in column 8, use its cumulative probability, rather than the larger value.

B.3. Write the cumulative probability on line 22.

C. *Explanation.* The value on line 22 is the probability that an impact will exceed the threshold value on line 20. Where a threshold value does not appear in column 8, the above method of selecting the nearest value provides a conservative probability estimate.

**Illustration B–1.—Instructions for Worksheet 2 Identifying Impacts**

Use this worksheet in field and office to make initial estimates of direct and indirect environmental impacts. Further explanation is found in Appendix B, Guidebook Section 1791.

*Instructions*

Place the EA or EIS number, title, location, date, and the analyst's name in the upper right corner.

1. *Alternative.* Identify the alternative briefly with a letter, number, acronym, or other appropriate code.

2. *Implementation Stage.* Use this line only for larger projects that are subdivided into different implementation stages.

3. *Action.* Insert a specific action associated with the alternative or decision implementation stage.

4. *Major Ecosystem Component Affected.* Insert the major ecosystem component being analyzed for impacts.

5. *Change Agent.* Write the primary, secondary, or higher-order change agent producing an impact. Designate primary change agents with *A*, secondary with *B*, etc.

6. *Increases/Decreases.* Insert a + or − in this column to indicate whether a change agent increases or decreases the ecosystem component or process being considered on this line.

**Note.—Use the + or − to indicate a change in some *quantity* associated with the component or process. *Do not make any value judgments about beneficial or adverse impacts.***

7. *Impacted Component or Process.* Name the ecosystem component, process, or index being affected by the change agent. Include the descriptive attribute.

8. *Estimated Quantity.* The quantity of the component, process, or index will change (+/−) by some number. If possible, estimate that number. If no numerical estimate is possible, place a percentage in this space or leave it blank.

9. *Units.* List the units, or dimensions, in which the component or process is usually described. If the impact is one for which a threshold has been established, use the same units as on Worksheet 1.

10. *Duration.* Impacts last over some time period. Estimate that period, based on the proposal or plan. Give a range, if necessary, but *avoid the use of "short-term" and "long-term."*

11. *Probability.* Not all impacts are equally likely. Whenever possible, assign a "probability of occurrence" to the impact estimate on this line.

12. *Relative Importance or Context.* The impact, or estimated change, may be important in relation to other components and processes, or within other contexts of the ecosystem. Use this space to briefly evaluate that relative importance.

13. *Footnotes.* Use this space to expand on any entry on the front of the sheet. Insert baseline values for existing conditions, where known. Number all footnotes.

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Worksheet 2: IDENTIFYING IMPACTS EA/EIS No. _____ Title _____

1. Alternative _____ 3. Action _____ 4. Major Ecosystem Component Affected _____ Date _____ Location _____

2. Implementation Stage _____ By _____ Page ____ of _____

| 5. Change Agent | 6. Increases/ Decreases | 7. Impacted Component/Process | 8. Estimated Quantity | 9. Units | 10. Duration | 11. Probability | 12. Relative Importance and Context |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

Use a numbered footnote to identify any item or entry that requires further remarks. Write remarks on reverse side of page.

Worksheet 2: IDENTIFYING IMPACTS EA/EIS No. _____ Title _____

1. Alternative A 3. Action Laying Pipeline 4. Major Ecosystem Component Affected Vegetation Date _____ Location _____

2. Implementation Stage _____ By _____ Page ___ of _____

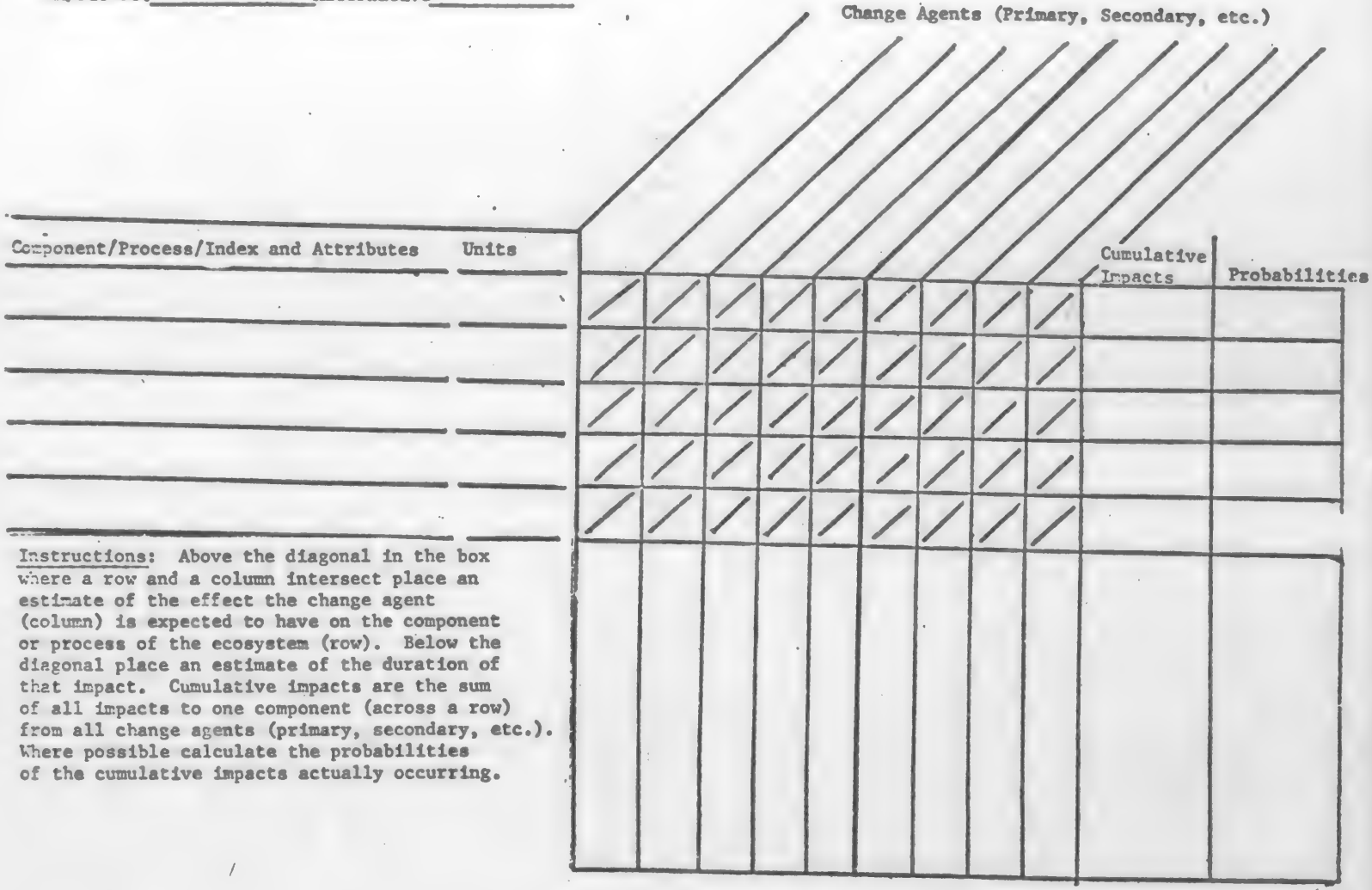
| 5. Change Agent | 6. Increases/ Decreases | 7. Impacted Component/Process | 8. Estimated Quantity | 9. Units | 10. Duration | 11. Probability | 12. Relative Importance and Context |
|---|---|---|---|---|---|---|---|
| Bulldozing and ditching | - | Brush density and Biomass | 20 | acres | 2-5 years | 100 | Density and biomass would gradually begin increasing above the initial loss point. |
| " | - | Diversity | 20 | acres | see column 12 | 100 | Bulldozing and ditching removes all vegetation. Stipulate that top 6-8 inches be replaced on top of backfill |
| Brushbeating | - | Brush biomass | 36 | acres | 10-15 years | 100 | Might affect pronghorn critical winter range and sagegrouse strutting and nesting. |
| " | + | Grass biomass | 36 | acres | 10-15 years | 100 | Grass cover will begin to decrease as brush increases. |
| Construction vehicle use | - | Brush biomass | | | | | Construction vehicle use is negligible outside brush beat area. |
| ORV use | - | Re-establishment | | | | | ORV use is variable. It could damage vegetation outside the ROW. |
| Revegetation | + | Grass biomass | 56 | acres | 20 years | 100 | Natural vegetation should return in about 20 years. |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Use a numbered footnote to identify any item or entry that requires further remarks. Write remarks on reverse side of page.

Illustration B-2

Matrix 1: Summary Impact Matrix

EA/EIS No._____Alternative_____




Instructions: Above the diagonal in the box where a row and a column intersect place an estimate of the effect the change agent (column) is expected to have on the component or process of the ecosystem (row). Below the diagonal place an estimate of the duration of that impact. Cumulative impacts are the sum of all impacts to one component (across a row) from all change agents (primary, secondary, etc.). Where possible calculate the probabilities of the cumulative impacts actually occurring.

Illustration B-2

## Matrix 1: Summary Impact Matrix

EA/EIS No. _____ Alternative A

The numbers and information in the boxes are not necessarily realistic but they do illustrate how to use the matrix.

Change Agents (Primary, Secondary, etc.)

| Component/Process/Index and Attributes | Units | Clearing and Grubbing | Bulldozing and ditching | Backfilling | Maintenance | CRV use | | | | Cumulative Impacts | Probabilities |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil Erosion | tons/acre | 0.6 / 1mo | 1.2 / 1mo | 0.6 / 1mo | 0.2 / 1mo | 0.4 / 1mo | / | / | / | / | 3/ 1mo | 60% |
| " | " | 0.35 / 5yr | 0.75 / 5yr | 0.35 / 5yr | 0.15 / 5yr | 0.25 / 5yr | / | / | / | / | 1.8/ 5yr | 60% |
| Sedimentation (added load to stream) | mg/l | 60 / 1mo | 120 / 1mo | 60 / 1mo | 30 / 1mo | 30 / 1mo | / | / | / | / | 300/ 1mo | 75% |
| " | " | 10 / spawn | 20 / spawn | 10 / spawn | 5 / spawn | 5 / spawn | / | / | / | / | 50/ spawning | 75% |
| | | / | / | / | / | / | / | / | / | / | | |

Instructions: Above the diagonal in the box where a row and a column intersect place an estimate of the effect the change agent (column) is expected to have on the component or process of the ecosystem (row). Below the diagonal place an estimate of the duration of that impact. Cumulative impacts are the sum of all impacts to one component (across a row) from all change agents (primary, secondary, etc.). Where possible calculate the probabilities of the cumulative impacts actually occurring.

Illustration B-3

## Matrix 2: Comparison Matrix

EA/EIS No._____

| Component/Process/Index and Attributes | Units | Alternatives | | | | | | | Thresholds | Affected Interest | Priority |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Instructions: Below the diagonal in each space (row/column intersection) place an estimate of the effect an alternative (column) is expected to have on a component or process (from the cumulative impacts column of Matrix 1). Place an estimate of the duration of the impact below the diagonal. List thresholds for significance together with affected interests in the next two columns. Place the priority assigned to each threshold in the last column. Use an asterisk to identify each impact in the matrix where synergistic effects are a factor.

## Matrix 2: Comparison Matrix

EA/EIS No._____

The numbers and information filled in the boxes are not necessarily realistic but they do illustrate how to use the matrix.

| Component/Process/Index and Attributes | Units | Alternatives A | B | C | D | E | F | G | Thresholds | Affected Interest | Priority |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil erosion | tons/acre | 3 / 1mo | 2.5 / 1mo | 4 / 1mo | 2.75 / 1mo | 2.5 / 1mo | / | / | / | | |
| | " | 1.8 / 5yr | .75 / 5yr | 2.1 / 5yr | 1.1 / 5yr | 1 / 5yr | / | / | / | | |
| Sedimentation (added load to stream) | mg/l | 300 / 1mo | 250 / 1mo | 325 / 1mo | 265 / 1mo | 225 / 1mo | / | / | / | | |
| | " | 50 / spawn | 40 / spawn | 60 / spawn | 45 / spawn | 45 / spawn | / | / | 45 / during spawning | State Fish & Game | |
| | | / | / | / | / | / | / | / | / | | |

Instructions: Above the diagonal in each space (row/column intersection) place an estimate of the effect an alternative (column) is expected to have on a component or process (from cumulative impacts column of Matrix 1). Place an estimate of the duration of the impact below the diagonal. List thresholds for significance together with affected interests in the next two columns. Place the priority assigned to each threshold in the last column. Use an asterisk to identify each impact in the matrix where synergistic effects are a factor.

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**Illustration B–4.—Instructions for Worksheet 3 Expected Impact Calculations**

This worksheet is recommended for use in analyzing impacts associated with significant issues.

*Instructions*

Place the EA or EIS number in the upper right corner. This number should correspond to the number on Worksheets 1 and 2, Guidebook 1791, Appendices A and B, respectively.

1.–3. *Alternative, Implementation Stage, and Action.* These should all correspond to the same items on Worksheet 2.

4. *Impact Sentence.* From the appropriate line of Worksheet 2, develop a declarative sentence that describes the impact on that line. State whether the change agent will increase or decrease the affected ecosystem component or process (Worksheet 2, columns 5, 6, and 7).

Include duration (column 10) and the relative importance and context of the impact (column 12). *No.*—Write the page number and line number of the impact being anlyzed from Worksheet 2 (e.g., "⅗" would refer to line 7 on the third page of Worksheet 2. There could be five pages of Worksheet 2 filled out.).

5. *Issue.* If this impact is associated with a significant issue identified on Worksheet 1, write that issue on this line. Include the issue number.

6. *Impact Estimates and Calculations.* If using a desktop calculator, fill out all columns. If a programmable calculator or a computer is used, fill out only columns 8 and 9, since the computations will be made automatically.

7. *Units.* Specify units used to describe the impact from column 10, Worksheet 2.

8. *Quantity (I).* In this column, estimate several different quantitative values for possible impacts. Try to estimate at least three: a mode (most likely value) and a range (extreme values). Begin on the top line with the smallest value and work down toward the largest.

9. *Probabilities. Indiv. (P).* Next to each quantitative impact in column 8 estimate a probability of that impact's occurring. Write probabilities as decimals between 0.0 and 1.00, not percentages.

If professional judgment is used (i.e., no hard data exist), begin by estimating the probability of the most likely impact (mode). Then estimate the probabilities of the extremes occurring. Third, assign probabilities to the remaining impact estimates in column 8. Sum the probabilities. If they do not total 1.00, re-evaluate and juggle your estimates until (1) they sum to 1.00 *and* (2) your professional judgment is comfortable with the estimates. It may be useful to fill out, or at least review, this column and column 8 in consultation with an interdisciplinary team.

*Cum.* After estimating individual probabilities, sum the individual probabilities cumulatively in this column.

10. $I \times P$. Multiply each impact estimate from column 8 by its individual probability in column 9 and write the result in column 10.

11. $I^2$. Square the impact estimate from column 8 and write the result in column 11.

12. $I^2 \times P$. Multiply the squared impact from column 11 by the probability in column 9. Write the result in column 12.

13. *Totals.* Sum columns 9, 10, and 12. Column 9 must always total 1.00.

14. *E(I)=Sum IP.* The total of column 10 is the expected impact, E(I).

15. *Sum* $I^2 \times P$. The total of column 12 is used to calculate the variance of E(I).

16. *Var(I).* Write the value from line 15 in the first blank space. Square E(I) (line 17), and write the result in the second blank. Subtract the second number from the first and write the result in the third blank on line 16. This is the variance of E(I).

17. *S(I).* Calculate the standard deviation of E(I), denoted by S(I), by taking the square root of Var(I). Write the result on line 17.

18. *CV.* Write S(I) in the first blank on line 18. Write E(I) from line 14 in the second blank, divide the first by the second, and multiply by 100. Write the coefficient of variation in the last blank.

19. *Percentage Change.* Estimate the percentage change represented by E(I), using a + or − to denote an increase or decrease.

20. *Threshold.* Select the most critical threshold from the issue identified on Worksheet 1 and insert that quantity here.

21. *Priority.* Insert the threshold's priority from Worksheet 1..

22. *Probability of Exceeding Threshold.* For an upper threshold, locate (in column 8) the closest *smaller* value to the threshold (i.e., the next smallest). Subtract the cumulative probability opposite that number (column 9) from 1.00, and write the answer on this line. For a lower threshold, use the closest *larger* value to the threshold, and use the cumulative probability without subtracting from 1.00. If the exact threshold value is listed in column 8, use it instead of the next smaller or larger.

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EA/EIS No. _____

Page ____ of _____

WORKSHEET 3: EXPECTED IMPACT CALCULATIONS

Date _____

By _____

1. Alternative _____ 2. Implementation Stage _____ 3. Action _____

4. Impact Sentence _____

No. ____

5. Issue _____

No. ____

6. Impact Estimates and Calculations

7. Units _____

| 8. Quantity (I) | 9. Probabilities Indiv.(P) | Cum. | 10. I x P | 11. $I^2$ | 12. $I^2 \times P$ |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| 13. TOTALS | 1.00 | | | | |

14. $E(I) = \text{Sum } I P$ _____

15. Sum $I^2 \times P$ _____

16. $Var(I) =$ _____ (Sum $I^2 P$ (line 15)) $-$ _____ ($[E(I)]^2$) $=$ _____

17. $S(I) =$ _____ ($\sqrt{Var(I)}$) 18. $CV =$ _____ ($\frac{S(I)}{E(I)}$) $\times 100 =$ _____ %

19. Percentage Change (+/-)_____ % 20. Threshold _____ 21. Priority _____

22. Probability of Exceeding Threshold _____

Illustration B-5

EA/EIS No. _____

Page ____ of _____

WORKSHEET 3: EXPECTED IMPACT CALCULATIONS

Date _____

By _____

1. Alternative: RMP - 2
2. Implementation Stage: Timber Sale
3. Action: Logging

4. Impact Sentence: Logging 40 acres in June at this location will probably increase sedimentation in Beaver Creek to 60 mg/l during the first year; this this is an increase of 100% over long-term watershed mean, compared with normal and annual fluctuation of 67%; the additional sedimentation is not likely to affect other resources

No. ____

5. Issue: Will sedimentation form logging affect trout spawning in Beaver Creek?

No. 6

6. Impact Estimates and Calculations

7. Units: Mg/l

| 8. Quantity (I) | 9. Probabilities Indiv.(P) | Cum. | 10. I x P | 11. $I^2$ | 12. $I^2 \times P$ |
|---|---|---|---|---|---|
| 30 | .15 | .15 | 4.5 | 900 | 135 |
| 60 | .70 | .85 | 42 | 3600 | 2520 |
| 80 | .15 | 1.00 | 12 | 6400 | 960 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 13. TOTALS | 1.00 | 1.00 | 58.5 | | 3615 |
| | | | 14. E(I)=Sum IP | | 15. Sum $I^2 \times P$ |

16. $Var(I) = \frac{3615}{\text{Sum } I^2P \text{ (line 15)}} - \frac{3422.25}{[E(I)]^2} = 192.75$

17. $S(I) = \frac{13.8834}{\sqrt{Var(I)}}$

18. $CV = \frac{13.9}{S(I)} \div \frac{58.5}{E(I)} \times 100 = 32.7\ \%$

19. Percentage Change (+/-) 95 %

20. Threshold 85

21. Priority 3

22. Probability of Exceeding Threshold - 0 -

Illustration B-6

EA/EIS No. _____

Page ____ of _____

WORKSHEET 3: EXPECTED IMPACT CALCULATIONS

Date _____

By _____

1. Alternative: RMP-2
2. Implementation Stage: Timber Sale
3. Action: Logging

4. Impact Sentence: Logging 40 acres in June at this location will probably increase sedimentation in Beaver Creek to 60 mg/l during the first year; this is an increase of 100% over long-term mean for watershed, compared with normal annual fluctuation of 67% the additional sediment is not likely to affect other resources. No. 17

5. Issue: Will sedimentation from logging affect trout spawning in Beaver Creek? No. 6

6. Impact Estimates and Calculations

7. Units: Mg/l

| 8. Quantity (I) | 9. Probabilities Indiv.(P) | Cum. | 10. I x P | 11. $I^2$ | 12. $I^2 \times P$ |
|---|---|---|---|---|---|
| 30 | .05 | .05 | 1.5 | 900 | 45 |
| 40 | .05 | .1 | 2.0 | 1600 | 80 |
| 50 | .1 | .2 | 5.0 | 2500 | 250 |
| 60 | .5 | .7 | 30.0 | 3600 | 1800 |
| 70 | .2 | .9 | 14.0 | 4900 | 980 |
| 80 | .1 | 1.00 | 8.0 | 6400 | 640 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 13. TOTALS | 1.00 | 1.00 | 60.5 | | .3795 |
| | | | 14. E(I)=Sum IP | | 15. Sum $I^2 \times P$ |

16. $Var(I) = \underset{\text{Sum } I^2P \text{ (line 15)}}{3795} - \underset{[E(I)]^2}{3660.25} = 134.75$

17. $S(I) = \underset{\sqrt{Var(I)}}{11.6082}$ 18. $CV = \underset{S(I)}{11.6} \div \underset{E(I)}{60.5} \times 100 = 19.2\ \%$

19. Percentage Change (+/-) 102 % 20. Threshold 85 21. Priority 3

22. Probability of Exceeding Threshold - 0 -

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**1791 Appendix C.—Identifying Reasonable Alternatives**

BLM's responsibilities for multiple use resource management in the public interest and the mandates of Sections 102(2)(C)(iii) and 102(2)(E) of NEPA require managers to consider alternative uses of available resources. Public involvement in the NEPA process helps managers to explore the full range of reasonable alternatives. This range may include alternatives which make use of less than all of the resources [FLPMA, 103(c)] in the short-term, thereby retaining options for future generations.

The requirement [NEPA, 102(E)] to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources" poses different challenges and requires different approaches depending upon the action being analyzed. Actions fall under the following categories: resource management plans (RMP's): RMP amendments; site-specifications involving significant impacts; site-specifications involving impacts that are not significant; and/or the upper levels of tiered analyses (e.g. regionals and programmatics). Geographic or temporal tiering may involve actions falling within more than one of these categories.

The following types of alternatives are considered: (A) alternative management approaches (for RMP's, and regional and programmatic analyses): (B) alternative uses of available resources (for all categories of actions); (C) partial (e.g. route segment, project component, etc.); system (alternative ways of achieving all or part of the objectives of the proposal), timing and location alternatives (for all categories of actions); and (D) mitigation measures (for all categories of actions). Alternatives evaluated in alternative type (A) usually comprise part of each of the other alternatives types. The level of specificity of alternative types (B), (C) and (D) will usually be greater in site-specific proposals than when considered in an analysis for alternative type (A).

Before an environmental analysis can begin to explore alternatives, the purpose *and* need for the action must be clearly understood. Alternatives do either of the following (1) meet all or part of the stated objectives of the proposed action, or (2) involve a different use of the resources which would have been committed had the proposed action been approved.

*A. Alternative Management Approaches*

1. RMP's: The analysis of alternative management options for RMP's (43 CFR 1601.5–5) helps establish different sets of goals and objectives for managing the resource area and different ways of achieving the same set of goals and objectives. The set of objectives approved for the RMP will guide the manager's decisions at the activity planning stage. Alternatives may range from allowing maximum natural sucession to maximum technological human use. Maximizing certain "uses" of resources while preserving or sacrificing others falls in between the two extremes and falls more under the second type of alternatives (alternative uses of available resources).

If a manager wants to explore broad alternatives to an existing RMP, it means a revision of the RMP. Minor changes can usually be handled as an RMP amendment and will either be documented as an EA or an EIS. Revisions of the total management approach may be necessary if the existing environment, or local, regional or national needs have changed to an extent that the existing RMP is no longer current.

1. RMP's and RMP amendments: The RMP and its associated EIS form one part of the upper tier (along with programmatic and regional studies) of environmental of environmental analysis. An such, a thorough and objective analysis is essential. It will be used in subsequent site-specific analyses to define the alternatives that have been covered.

2. Regional analysis: Regional analyses function as an upper tier of environmental analysis in that they set goals and objectives and a management approach using a regional, rather than resource area perspective.

3. Programmatic analyses: Programmatic analyses set goals and objectives and a management approach from a program rather than geographic perspective.

Programmatic goals and objectives and regional goals and objectives are used to help determine goals and objectives for an RMP by limiting the range of reasonable alternatives.

*B. Alternative Uses of Available Resources*

NEPA requires agencies to explore alternatives to proposals involving "unresolved conflicts concerning alternative uses of available resources." This type of alternatives consideration is necessary for all categories of actions.

1. RMP's, RMP amendments, regionals, and programmatics: These upper tiers of environmental analysis should resolve some conflicts among alternative uses of resources. Many of these conflicts cannot be resolved until the lower tiers (e.g. site-specific analyses), but the conflicts resolved to establish the management approach help set limits on the alternatives to be explored in the lower tiers.

In RMP's a preferred action may stress the allocation of certain resources at the expense of others. Alternatives may investigate alternative allocation of the resource or a balance somewhere in between. Alternatives mentioned in the planning regulations (43 CFR 1601.5–5) range from favoring resource protection to favoring resource protection to favoring resource production, but even within these there are still many remaining conflicts which must be resolved either on a broad RMP basis or on an individual action or activity planning level.

2. Site-specifications involving impacts that are not significant: Although the significance determination cannot be made until the environmental analysis process is complete, this discussion focuses on how to determine the reasonable alternatives for analysis.

(a) If the proposal and its impacts (in an area with an existing RMP) are found to be in conformance with the RMP, the team must explore the "no action" alternative and any other "resonable alternatives" identified during stages 1–5 of the environmental analysis process (including those identified by the Bureau in carrying out its stewardship responsibilities). Alternatives that are not in conformance with the RMP need not be explored. This illustrates how tiering can be used to limit alternatives in the lower tiers.

Three criteria may be used to limit the range of reasonable alternatives. the alternatives to be considered should: (1) result in less or different environmental impact than the proposal; (2) meet more or different goals and objectives for the RMP area; or (3) meet more or different goals of NEPA, FLPMA, and/or the OCS Lands Act (BLM Guidebook 1790, Appendix A). The above criteria are used to make full use of the tiering concept; but, as the analysis proceeds, judgment or public input may indicate that another alternative must also be explored.

(b) If the proposal and its impacts are not in conformance with the existing RMP it is handled as described in the planning regulations for plan amendments. The analysis is documented as an EA.

(c) In instances where there is no approved RMP, the alternatives considered should: (i) result in less or

different environmental impact; or (ii) meet more or different goals and objectives of NEPA, FLPMA and/or the OCS Lands Act.

3. Site-specific actions involving significant impacts: If significant impacts are expected from a proposed action, two questions must be answered before deciding to prepare an NOI to begin an EIS or to proceed with analysis for an EA: (a) is the proposed action in conformance with an existing RMP; and (b) if it is, does the EIS for the RMP cover the action specifically or within consideration of cumulative impacts, and is this coverage adequate?

(a) If the proposed action *is not* in conformance with an existing RMP, an EIS must be prepared. The "no action" alternative and a range of alternatives in conformance with the RMP must be explored.

3 (b) If the proposed action *is* in conformance with an existing in the RMP/EIS or (ii) the cumulative impacts in the RMP cover the impacts of the action.

(i) If the proposal *is* specifically covered in the RMP/EIS and the coverage is still current, the decision approving or disapproving the proposal can be made and the previous analysis referenced in the record of decision. This record of decision must conform to the requirements of 40 CFR 1505.2.

(ii) If the proposal *is not* specifically covered in the EIS for the RMP, but the cumulative impacts are adequately covered in the RMP, the analysis proceeds to insure that specificity and currency of the analysis for the RMP are adequate. Public input must be sought.

If the analysis and public involvement do not demonstrate that (1) public controversy exists; (2) the existing environment has changed (beyond the range expected in the EIS for the RMP when trends are taken into account); and (3) local, regional, and national needs have changed (beyond what was expected in the EIS for the RMP), the analysis may be documented as an EA. If the above three circumstances do not arise, the range of alternatives may be limited to those consistent with the RMP unless the analysis reveals new information which was not taken into account in the analysis for the RMP.

If any of the above three circumstances arise, the analysis should proceed as an EIS. In this case the range of alternatives may go beyond those that are consistent with the RMP, recognizing that if such an alternative is approved it requires an RMP amendment or a revised RMP.

C. *Partial Location, Timing, or System Alternatives*

These are handled in the same way as *B. Alternative Uses of Available Resources.*

D. *Mitigation Measures*

These are handled in the same general way as B. Alternative Uses of Available Resources. In many cases specific mitigation measures cannot be addressed until a site-specific analysis is conducted.

1. RMP's, RMP amendments, and upper tiers of environmental analysis: Mitigation alternatives for these categories are usually in the form of standard stipulations for certain actions and areas or actions to be given special consideration.

2. Site-specific actions involving signficant impacts: The analysis team must explore measures which would reduce or eliminate the significant imnpact. If such impacts are eliminated during the course of the analysis, the need for documentation is reduced to an EA.

*Agency's Preferred Alternative—Environmentally Preferable Alternative*

The CEQ's NEPA regulations [40 CFR 1502.24(2)] require the agency to identify its preferred alternative in the draft EIS (if one exists). They require the preferred alternative to be identified in the final EIS unless another law prohibits it.

The broad scope of the definition of "human environment" in the CEQ's NEPA regulations (40 CFR 1508.14) and BLM's responsibilities under FLPMA for mutliple use resource management in the public interest interact in such a way that the environmentally preferable alternative become (by definition) the agency preferred alternative. This is true for alternatives involving significant impacts and those involving impacts that are not significant.

When proposals for BLM action fall outside the scope FLPMA (actions pursuant to the Outer Continential Shelf Lands Act), objectives to be attained by the "environmentally preferred alternative" shall be derived from NEPA's goals. This is consistent with Section 4 of the Outer Continental Shelf land Act and conforms with 40 CFR 1500.1 which specifies that NEPA "is our basic national charter for protection of the environment."

Whether an action falls within or outside the scope of FLMPA, thresholds for significance and priorities developed in the analysis process and public comment and response are used to help determine the environmentally preferable alternative.

Applicants for BLM action and those who would benefit from the proposed action become affected interests. The impacts of not fulfilling their identified purpose and need are assessed in the law "no action" alternative. In the environmental analysis, goals of systems at many levels may appropriately be taken into account. On occasion, the "system" impacted (beneficially or adversely) may be an individual or group or an organization. Tiered environmental analyses allow for appropriate consideration of impacts on various involved system levels Illustration A–3. In each instance of environmental analysis BLM must maintain the perspective of its Federal stewardship role in identifying public benefit of a particular action.

The NEPA process is generated by a need for Federal agency action for public purposes, though the original proposal may have come from the private sector or another government entity. Ultimately, the implication for goals preferable to the society—the nation as a whole—must be yardstick by which environmental impacts are measured pursuant to NEPA.

Objectives constitute planned results to be achieved, often within a stated time period. They are derived from, and subordinate to, goals. They should be chosen so that they are quantifiable and attainable and so that their attainment is measurable.

Specifying objectives as described above requires establishing thresholds for attainment of those objectives. when objectives are specified in terms of thresholds, they can be linked directly to, and become part of, the thresholds for significant established byprocedures described in Appendix B.

The NEPA, FLMPA, OCSLA, and other normative goals, when prioritized according to their functional, normative, and preference values in the scoping process, become the basis for establishing environmentally preferable *objectives* for any given proposal. These objectives, in turn, form the basis for identifying significant impacts and for evaluating each alternative in terms of what is environmentally preferable at a particular time and place. Such objectives, specified as thresholds, constitute targets for developing mitigation measures, new alternatives, and monitoring programs. They also aid the decisionmaker in prioritizing his decision criteria and in reaching a decision objectively.

**Appendix D (1791).—Checklists for Environmental Analysis**

The BLM, as a mission-oriented agency, has many land management responsibilities that are carried out essentially the same way, regardless of location. Specific details of how a land management action is carried out may

differ from place to place, but the basic action is the same.

For example, allocating grazing levels is a basic action of range management. Numercial allocations will differ, depending on range condition, soil types, climate, etc.

Environmental analysis requires knowledge, first, of what man intends to do, and then, of what the unintended effects of those activities will be. Man's intended and unintended impacts interface through primary change agents.

Experience with a particular type of action permits us to develop checklists of all subactions, activities, subactivities, and primary change agents associated with that action. Experience should also improve our ability to estimate environmental impacts resulting from any action.

This appendix suggests ways to develop checklists useful for identifying primary change agents and systematically analyzing environmental impacts. The ideas here can be used for all levels of analysis, from small, simple activities routinely covered by environmental assessments (EA), to large complex actions that require major environmental impact statements (EIS). Adapt these suggestions to each situation.

1. *Proposed Actions and Alternatives*

A *proposed action* is an action designed to achieve a purpose; it usually involves the use of one or more resources. *Alternatives* to that action are designed to achieve the same basic purpose using alternative means. Some alternatives are generally included in an initial proposal. Others can be developed during analysis as the discovery of unforeseen impacts requires modification of the proposal.

Because alternatives must be analyzed as completely as the proposed action, "alternatives," when used alone, includes the proposed action.

2. *Subdivisions of Alternatives*

2.1 *Implementation Stages.* Depending on size and complexity of a proposal, alternatives can be subdivided. For a large proposal, an alternative may include several *implementation stages.* These are phases of an action that may occur sequentially or concurrently, but which are basically separate from each other. Illustration 1 lists implementation stages of surface mining and oil shale development.

The concept of implementation stages is useful for aggregating a number of actions that usually require individual analyses and that normally result in individual EA's. By aggregating, each separate action can be thought of as an implementation stage, and all actions can then be analyzed concurrently for a single EA or EIS, depending on significance of impacts.

2.2 *Subactions.* Each alternative and/or implementation stage can be divided into several *subactions.* A subaction is just another level in the organizational hierarchy of a complex action. Illustration 2 lists subactions associated with different implementation stages of oil shale development.

2.3 *Activities and Subactivities.* An *activity* (or, where complexity requires it, a *subactivity*) is yet another subdivision of an alternative. Activities are smaller than subactions, and they can be further subdivided into subactivities, if necessary. Illustration 3 shows a five-level hierarchy of implementation stages, subactions, activities, and subactivities associated with the action of surface mine development. Illustration 4 is a comprehensive list of activities common to surface mine development.

2.4 *Primary Change Agents.* Discrete activities (or subactivities) generate *primary change agents.* A change agent is the cause of one or more environmental impacts. A primary change agent results directly from man's activities and produces direct impacts. Higher-order change agents produce indirect impacts (Appendix B).

A change agent can be a material, substance, energy form, object, or activity capable of producing an impact. Illustration 5 contains a list of primary change agents associated with oil shale development.

3. *Developing Checklists for Environmental Analysis*

Checklists have both advantages and disadvantages. Among advantages is the fact that once a checklist has been developed, it provides users a quick, thorough review of things to consider. A disadvantage is that users who place too great a reliance on checklists can miss important factors when an action is not "typical."

The purpose of environmental analysis checklists is to identify all primary change agents resulting from alternatives. The hierarchical approach described in Section 2 provides a systematic approach to identifying change agents.

If checklists are to be developed in a district or area office, they should be done "on the job," i.e., during an actual analysis by an interdisciplinary team. Where necessary, checklists should be revised and updated promptly as soon as deficiencies are discovered.

3.1 *Initial Lists.* To develop a checklist, begin at the highest level of the hierarchy. For a complicated analysis, start with implementation stages. Write each implementation stage on a separate sheet of paper. Then list on the appropriate sheet all the subactions involved in that stage.

If there is room on the same sheet of paper, use a branching diagram to list activities and subactivities, as in Illustration 3. Another way is to list subactions, activities, and subactivities by BLM program on separate sheets of paper (Illustration 6).

When generating checklists, it is sometimes possible to continue through subactivities into primary change agents and direct impacts (Illustration 6).

3.2 *Branching Diagrams.* Illustration 3 provides one example of a branching diagram. Another type that links subactivities and their change agents with general impacts is presented in Illustration 7.

3.3 *Matrices.* Often subactions share many of the same activities which, in turn, share similar subactivities. Similarly, several subactivities may generate the same type of change agent. This situation can be handled very concisely through a series of matrices.

Illustrations 8 and 9 show how this is done. The list of subactions in Illustration 2 is written across the top of the matrix in Illustration 8 to identify the columns. Activities that produce change agents are listed down the left side to identify the rows. An *X* is placed at each row/column intersection in which an activity is associated with a subaction.

On the next matrix, Illustration 9, activities from the left-hand side of Illustration 8 are new listed across the top. Change agents down the left side of Illustration 9 are from Illustration 5. Change agents are related to the activities by a "bullet" in the row/column intersection.

4. *Socioeconomic Applications.*

The above methods can be applied as narrowly (e.g., within a single resource) or as broadly as desired. An example checklist of broad socioeconomic factors as they relate to resource development is presented in Illustration 10. Instructions for using these socioeconomic checklists are found in "Draft Guidance for Socioeconomic Inputs to Grazing Environmental Impact Statements (EIS's)." [Issue in draft, for comment, by Instruction Memorandum 80-216.]

**Illustration D–1.—Implementation Stages of Two Kinds of Energy Development**

*Surface Mining*

1. Exploration
2. Mine development
3. Mine production (ancillary activities)
4. Mine production (extraction activities)
5. Reclamation

*Oil Shale Development*

1. Site preparation
2. Preproduction mining
3. Ancillary facilities
4. Commercial facilities
5. Operation

**Illustration D–2**

*Major Oil Shale Development Subactions*

1. Build/extend roads
2. Build impoundments
3. Sink shafts
4. Mine (development/retort construction)
5. Construct underground facilities
6. Construct surface facilities
7. Process raw materials/operate
8. Build power transmission lines
9. Build staging area (off-tract)
10. Build pipelines (off-tract)
11. Build commercial facilities

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Illustration D-3

A partial hierarchical list of action, implementation stages, subactions, and activities associated with surface-mine development. Note that many activities occur more than once within the five levels.

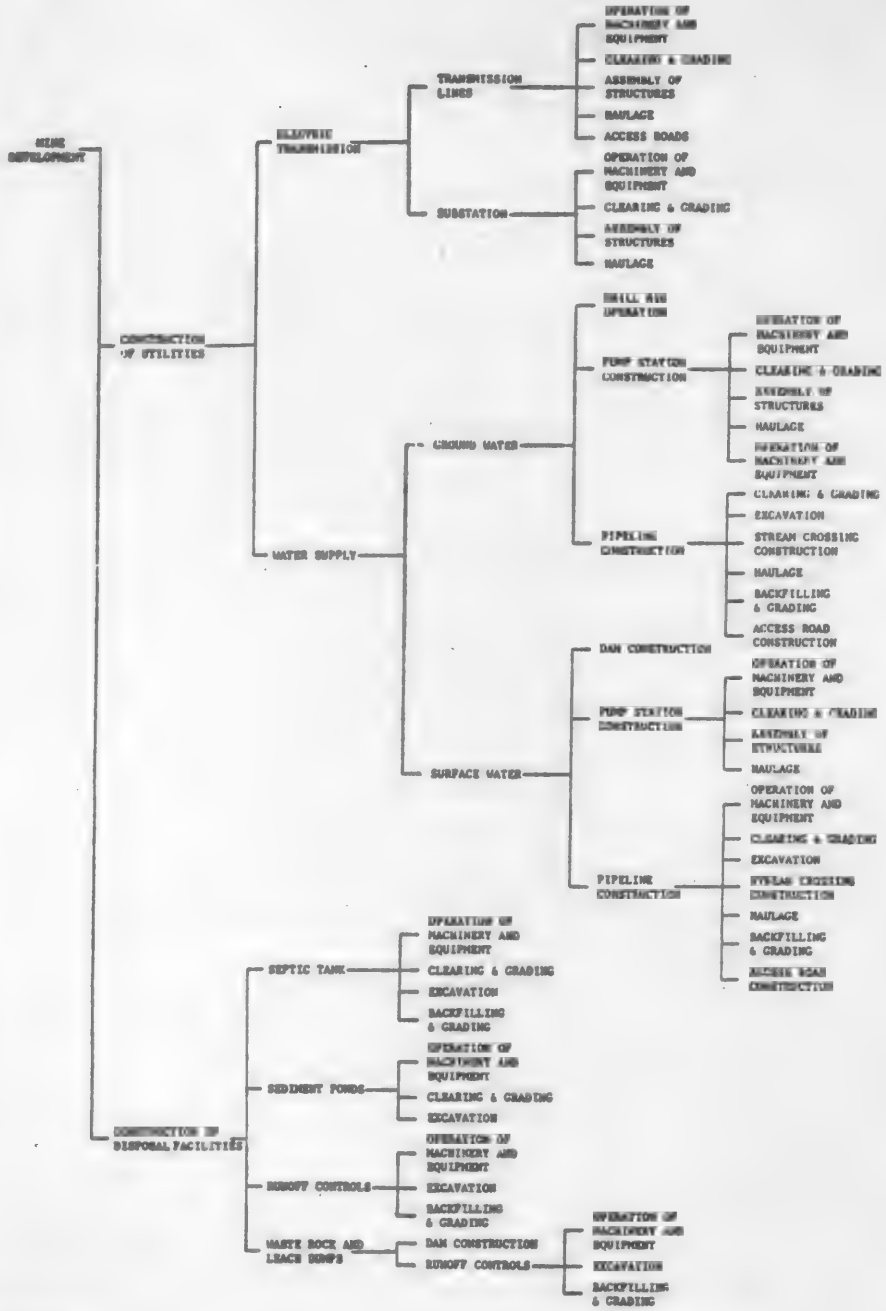


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**Illustration D–4**

*List of Activities Associated With Surface Mine Development*

1. Survey land surface
2. Operate drill rigs
3. Remove surface features
4. Store topsoil materials
5. Dewater
6. Blast
7. Remove overburden
8. Dispose of overburden
9. Extract minerals
10. Replace topsoil and revegetate
11. Irrigate
12. Operate machinery and equipment
13. Clear and grade
14. Excavate
15. Backfill and grade
16. Construct stream crossings
17. Construct dams
18. Assemble structures
19. Cut and fill
20. Haul.
21. Prepare surfaces and roadbeds
22. Store minerals
23. Crush minerals
24. Load minerals
25. Operate railroads
26. Operate access roads
27. Operate haul roads
28. Store fuel and chemicals
29. Operate maintenance yards and parking lots
30. Operate electric transmissions
31. Operate water supply
32. Operate sewage treatment plants
33. Operate septic tanks
34. Operate runoff controls
35. Operate waste rock and leach dumps
36. Operate sediment and leach ponds

**Illustration D–5**

Primary change agents associated with oil shale development in western Colorado. Note how categories are used to group change agents.

*Meteorological*

Create fugitive dust
Create odors
Create noise and vibration
Emit steam
Create water vapor
Create icing
Create fog
Emit particulates and aerosols
Emit $SO_2$
Emit $H_2S$
Emit NO
Emit $NO_2$
Emit $NO_x$
Emit CO
Emit $CH_4$
Emit NMHC (non methane hydrocarbons)
Emit THC (total hydrocarbons)
Emit ozone and other oxidants
Emit arsenic
Emit mercury
Emit selenium

*Topographic*

Create landslides
Alter contour of land
Alter surface drainage patterns

*Edaphic*

Create compaction
Create erosion
Remove all vegetation
Alter humus content
Mix soil profile

*Geologic*

Cause ground to subside
Expose shrink/swell clays

*Biological*

Disturb vegetation
Increase road kills
Disturb soil microorganisms

*Hydrological*

Alter surface runoff
Alter peak flows (flash flooding)
Aler sedimentation
Alter evaporation
Alter seepage
Alter water table levels
Alter downstream flows
Alter stream channels
Alter groundwater chemical composition
Alter groundwater flows

**Illustration D–6.—Environmental Analysis Checklists**

1. Subactions and activities of BLM "Activity Programs" that generate proposed actions.
2. Change agents.
3. Potential impacts associated with change agents.

**Checklist 1.—Subactions and Activities by Program**

A. Lands and Realty

*Granting of Rights-of-Way*

Powerline
Pipeline
Telephone line
Communication site
Highway
County road
Access road
Trail
Railroad
Canal or ditch
Fences

**Withdrawals**

*Obtaining Rights-of-Way and Easements*

Access Roads
Water development and use
Fences

*Leases*

Dump site or land fill
Recreation area
Sewage plant
Dam site
Building site

*Transfers of Title*

Sale
Exchange Acquisition

*Temporary Use Permits*

ORV events
Group meetings, rock
Concerts, group
Camping, etc.
Movie locations
Others

B. Minerals

*Sales*

Gravel and sand
Common borrow
Building stone

*Permits*

Exploration
Drilling Seismic

*Leases*

Coal
Oil and gas
Oil shale
Bentonite
Sodium and potassium
Phosphate

C. Forest Products

*Timber Sales*

Clear cutting
Partial cutting
Thinning
Salvage

*Stand and Site Improvement*

Pre-commercial thinning
Slash disposal and snag
Falling
Brush control
Tree planting
Insect control
Disease control
Animal control

*Sales of Other Forest Products*

Ferns
Cacti
Christmas trees
Cones
Pinyon nuts

D. Range Management

Grazing Use Allocation
Wild Horse Use Allocation
Grazing Authorization—Plan or System Implementation
Range Improvement
Pest and Predator Control

E. Recreation Management

**Visual Resource Protection and Improvment**

*Recreation Management*

Fishing
Hunting
Winter sports
Water sports
Collecting
Sightseeing
Specialized events-ORV, etc.
Primitive Values

F. Watershed

*Water Management*

Protection and enhancement of water quality

*Soils Management*

Erosion prevention
Erosion reduction

*Air Quality Management*

Endangered Resource Protection

G. Wildlife Habitat Management

*Terrestrail Habitat*

Expansion
Improvement
Maintenance

*Aquatic Habitat*

Expansion
Improvement
Maintenance

*Wetlands*

Expansion
Improvement
Maintenance

*Endangered Resource Protection*

Expansion
Improvement
Maintenance

H. Firefighting and Rehabilitation

*Fire Operations*

I. Recreation Maintenance

Facility Maintenance

J. Transportation Maintenance

Road, Trail, and Bridge Maintenance

K. Building Maintenance

**Checklist 2.—Change Agents**

Trampling and crushing
Rutting and eroding
Clearing and grubbing
Brush beating and chaining
Controlled burning
Grazing and browsing
Scarifying
Piling
Tree felling
Log yarding—cable, full suspension
Log yarding—cable, end suspension
Log yarding—caterpillar traction
Log yarding—aerial
Log loading
Tree girdling
Ground spraying
Aerial spraying
Plowing and tilling
Drilling and seeding
Hand planting
Machine planting
Biologically introducing or excluding
Poisoning
Trapping and catching
Shooting or killing
Dumping and littering
Emitting Air pollutants
Flooding
Harvesting
Emitting water pollutants
Emitting soil pollutants
Using water
Consuming water
Pumping
Dredging and sluicing
Excavating
Filling, leveling, and terracing
Placing culverts and diversions
Drilling and blasting
Grading and paving
Hauling and transporting
Well drilling
Shaft digging
Concrete and asphalt mixing and laying
Fencing and barricading
Erecting towers and poles—Aerial
Erecting towers and poles—Ground
Erecting buildings and structures
Erecting dams and earthworks
Erecting docks, ramps, floats
Pipelaying
Line stringing
Processing, manufacturing, producing
Storing and stockpiling
Excluding
Vandalizing

**Checklist 3.—Potential Impacts**

*Air*

Creates dust
Creates odors
Emits particles
Emits chemicals

*Water*

Alters sedimentation rate
Alters stream channels
Alters downstream flow
Alters peak flows
Alters seepage rate
Reduces or increases quantities
Alters temperature
Alters groundwater recharge
Changes water table level
Changes water quality

*Soils*

Creates compaction
Alters erosion rate
Alters contour or land
Alters drainage pattern
Removes soil
Changes soil temperature
Changes fertility
Changes humus content
Changes permeability rate
Changes profile
Creates instability
Introduces chemicals
Introduces organisms

*Vegetation*

Removes, destroys, or damages vegetation
Changes community type
Changes species composition or diversity
Changes vegetative density
Changes vegetative vigor
Introduces an exotic
Alters water supply
Introduces disease
Introduces pests

*Animals*

Changes in species populations, age groups, sex ratios
Changes in species distribution
Changes in species diversity or composition
Changes in species vigor or reproduction
Changes in water supply
Changes in water quality
Changes in food supply
Changes in nesting, calfing, breeding or other special areas
Introduces exotics
Introduces disease
Introduces pests
Harasses
Physically harms or causes death
Restricts, excludes, or entraps

*Human Values*

Color
Texture
Harmony
Form
Light
Vibration
Sound
Frequency
Rhythm and periodicity
Economic
Infrastructure
Socio-cultural
Emotional

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Illustration D-7

Impacts of Operations of Waste Rock and Leach Dumps

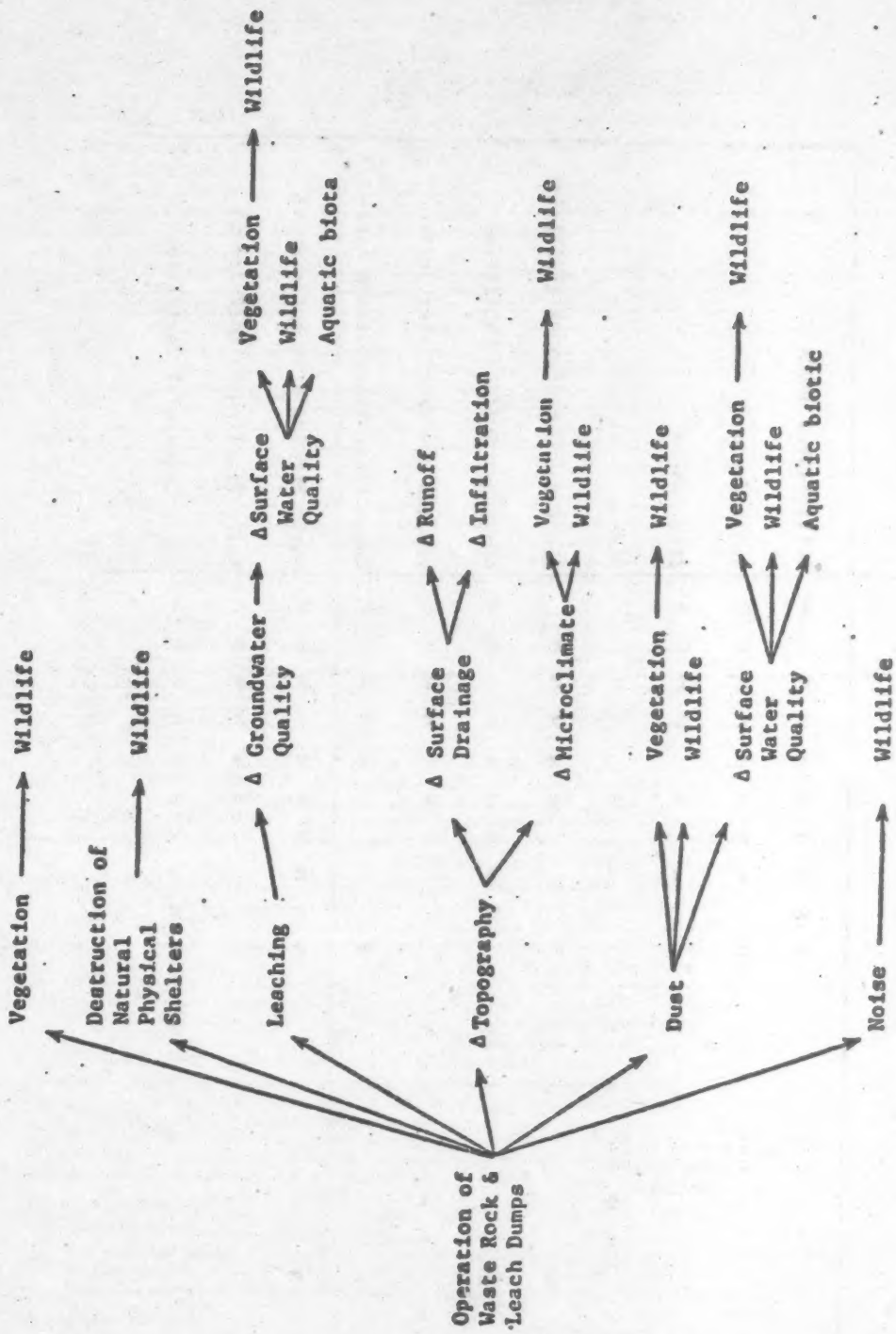

Illustration D-8

SUBACTIONS

| ACTIVITIES THAT PRODUCE PRIMARY CHANGE AGENTS | Build/Extend Roads | Build Impoundments | Sink Shafts | Mine | Construct Underground Facilities | Construct Surface Facilities | Process Raw Materials/Operate | Build Power Transmission Lines | Build Staging Area (off-tract) | Build Pipeline(s) (off-tract) | Build Commercial Facilities |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Remove Vegetation | x | x | x | | | x | | x | x | x | x |
| Store Equipment/Vehicles | x | x | x | | x | x | | | x | x | x |
| Operate Equipment | x | x | x | x | x | x | x | x | x | x | x |
| Drill & Blast | x | x | x | x | x | x | x | x | x | x | x |
| Grade (Excavate & Fill) | x | x | | | x | x | | x | x | x | x |
| Dispose of Waste | x | x | x | x | x | x | x | | x | x | x |
| Pave or Surface | x | x | | | | x | | | x | | x |
| Fence | x | x | x | | | x | | | x | | x |
| Increase Traffic | x | | | | | x | | | x | | x |
| Disturb Vegetation | x | x | x | | | x | | x | x | x | x |
| Remove Underground Water (dewater) | | | x | x | x | | x | | | | x |
| Dispose of Water | | | x | x | x | | x | | | | x |
| Sink Shafts | | | | x | | | | | | | |
| Build Conveyor | | | | x | | | | | | | |
| Operate Conveyor | | | | x | | | x | | | | |
| Crush Mined Shale | | | | x | | | x | | | | |
| Erect Structures | | | | | x | x | | x | x | | x |
| Exhaust Retorting Gasses | | | | | | | x | | | | |

Illustration D-9

ACTIVITIES

PRIMARY CHANGE AGENTS

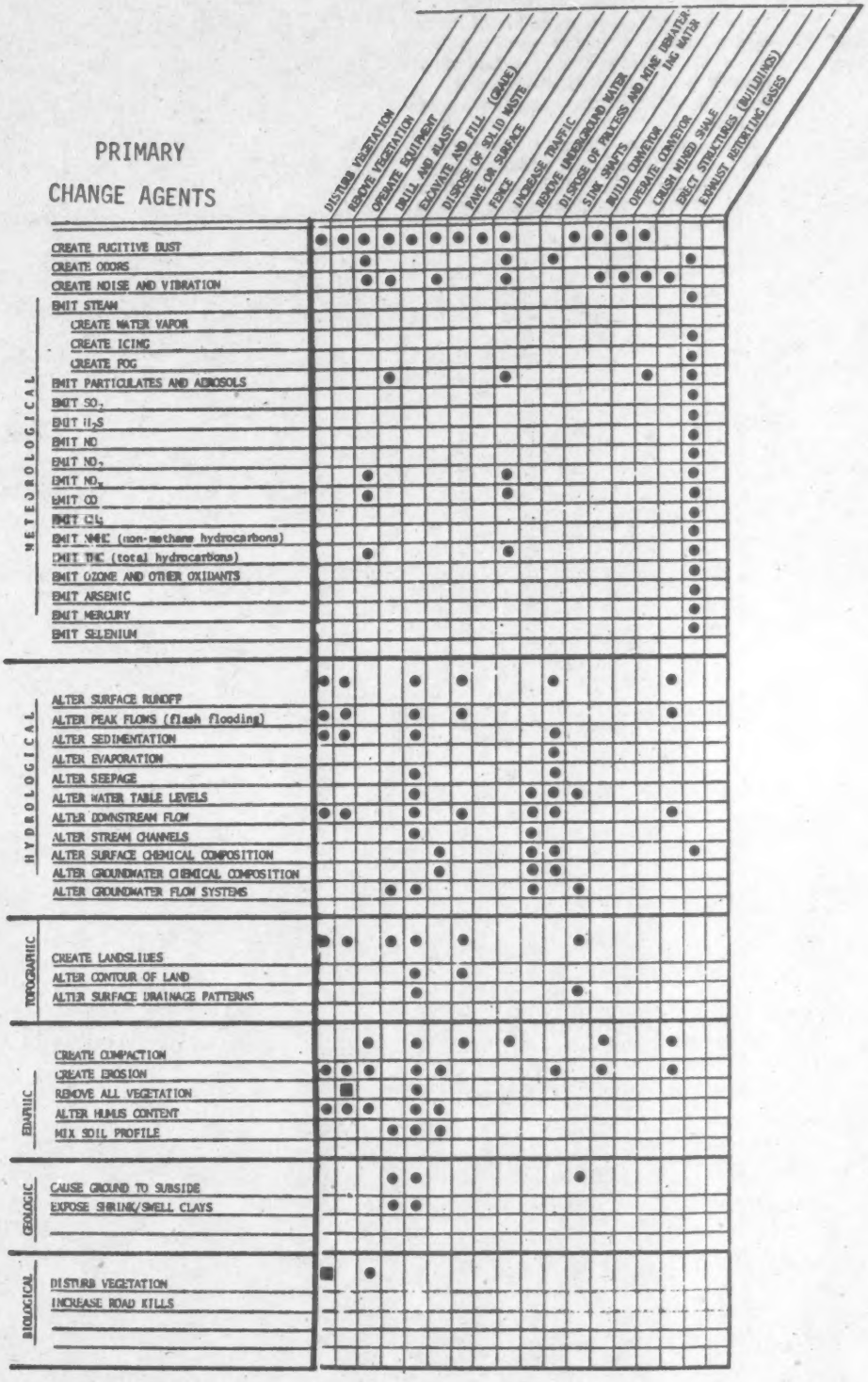


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**Illustration D–10**

*1. Socioeconomic Checklist*

Detailed information about each component on this checklist can normally be found in SEPs or most regional analyses.

A. Resource production.*
B. Income.
C. Employment.
D. Population.
E. Infrastructure.
1. Public finances.
2. Public administration.
3. Retail and wholesale trade.
4. Finance, insurance, and real estate.
5. Housing.
6. Education.
7. Health care.
8. Mental health.
9. Social services.
10. Sewer and water systems.
11. Public utilities.
12. Transportation and communications.
13. Police and fire protection.
F. Lifestyles.
G. Attitudes and expectations.

*2. Resources Checklist*

Listed below are resources that should be analyzed in future grazing EISs. Early in the EIS process, the resource specialists must provide the social scientist with resource production estimates, both current and projected. In many cases, it will expand the workload of the specialists; therefore, ample time must be programmed to generate estimates. Frequently, the social scientist will be required to assist in developing these data.

A. Forest industry.
B. Agriculture.
C. Minerals.
D. Recreation.
E. Water, soil, and air.
F. Wilderness.
G. Wild horses and burros.
H. Wildlife.

*3. Levels of Systems*

Socioeconomic impacts affect different elements (groups or levels) within a given social environment. These separate elements can be related to levels of systems in much the same manner as plants within biological systems (i.e., cell, organism, plant species, plant communities, ecosystems, etc.). The levels of systems most likely to be of concern to the social sciences in grazing EISs include the following:

A. *Individuals.* This system level includes individual persons (e.g., ranchers) or individual operations or businesses.

B. *Groups.* These include *informal* associations of social groups (ranchers, environmentalists, poor, senior citizens, etc.) or functional groups (livestock industry, agribusiness, local eating establishments, etc.).

C. *Organizations. Nongeographic:* this level covers formal, chartered clubs, societies, rancher or business associations, and other interest groups.

*Geographic:* these include towns, cities, counties, substate regions, states, and multistate regions.

D. *National.* Impacts that affect the entire United States fall into this level. Many attitudinal values (wildlife, open space, wilderness, etc.) frequently have national significance.

E. *International.* Impacts that transcend the national borders come under this level. For example, sedimentation or salinity levels in rivers (e.g., Colorado River) that flow out of the U.S. can be affected by soil erosion factors in certain grazing areas administered by BLM.

The use of these different system levels allows the social scientist to look out from within the EIS study area and identify the full range and scope of impacts caused by BLM grazing actions.

*Outputs from resources identified in Resources Checklist.

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